COMPUTERWORLD

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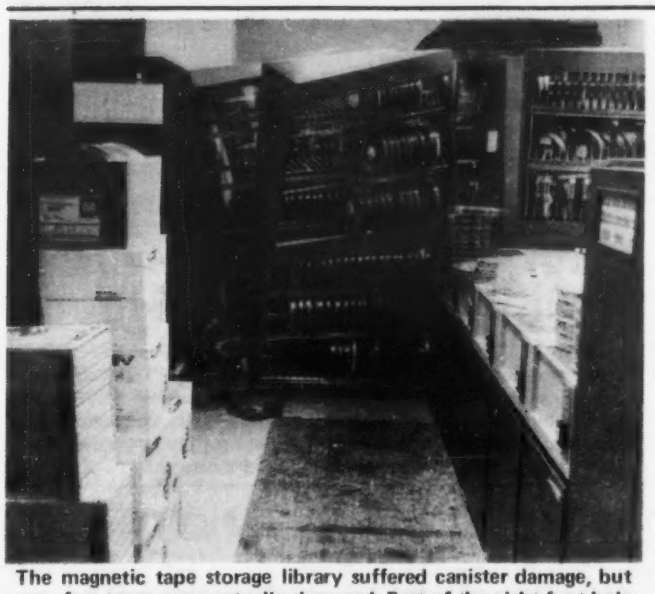


The magnetic tape storage library suffered canister damage, but very few tapes were actually damaged. Part of the eight-foot hole caused by the explosion can be seen in the upper right. (CW Photo) (Other Photo on Page 6)

Security Cut Damage From DP Center Blast

By Thomas J. Morton
CW Midwest Bureau

LAWRENCE, Kan.,– Because they had the foresight to plan for all emergencies, including a possible bombing, the officials of the University of Kansas here protected their own equipment, prevented expensive downtime, and maintained operating records efficiency when their main DP center became the target for a bomber.

After incidents last spring in which two non-students were killed in an exchange of gunfire during a campus uprising, the university clamped down on security. It was at that time that visitors to the center were challenged. On Nov. 24 of this year, face recognition for access was mandatory.

To enter the center, a worker or a visitor had to enter through the front door of the center, while the rear door was locked. Permission to enter the center was obtained by face recognition. If an unrecognized visitor or worker or user wanted access, he first had to convince the shift supervisor of the validity of his visit, and then he was only allowed to enter when accompanied by that supervisor.

According to John Seitz, the center's night supervisor, an an-

(Continued on Page 6)

Users Can Save 15% to 19% On Certain 2314 Rentals

By Peter L. Briggs
Special to Computerworld

WHITE PLAINS, N.Y. – IBM gave its customers a rare Christmas treat last week by announcing a way for System/360 disk users to save from 15% to 19% on their 2314 rental prices.

New configurations also will permit 2311 disk users to upgrade for less money.

The change involves the three-spindle 2319, originally announced only for use with the integrated file adapter on the 370/145. But now users of 360 models 30, 40, 50, 65, 67, 75, 85, 91 and 195 will be able to hang up to three of the 2319s on a 2314 controller with a field modification.

For example, a user with a three-spindle 2314 (actually comprised of a one-spindle 2312 and a two-spindle 2318 and a 2314 controller) could save $455/mo by switching to the 2319.

First deliveries of the 2319 are scheduled for April.

IBM wrapped this present around the announcement that there would no longer be any overtime charges for 2314 type disk drives or 2319s used more than the standard 176 hours per month. Previously, 2314 customers paid an additional 10% of the normal hourly rate for overtime, and large users stand to save considerable amounts of money by the elimination of this charge.

Small Users Too

Even the smaller user, with a 360/30 or 40 and three or four 2311 disk drives could save money with a 2319. For three 2311s, the user could shift to a three-spindle 2319 by spending an additional $245/mo. The four-2311 user could save some $325/mo, plus he would get three times the storage capacity and faster access times.

(Continued on Page 4)

80-Column Card Input

NCR Aims Century 50 At Small Disk User

By Frank Piasta
CW Staff Writer

DAYTON, Ohio – NCR has made many features of its Century Series available to the small business user with its introduction of the disk-oriented Century 50.

Priced to appeal to the first-time user, as well as those users upgrading from a card-based operation to disk, the Century 50 sells for about the same price as the IBM System/3, but offers more processing power, according to NCR.

The claims apparently are based on NCR's use of its 800 nsec rod memory, in contrast with 1.52 μsec time of the core used in the System/3. The rod memory was first used on earlier Century models.

NCR has stressed the upward compatibility of the Century 50 with the other three models of the Century Series.

The Century 50 user will be able to retain nearly all his software when he decides to upgrade, while compatibility between the System/3 and the 360 and 370 Series is limited to RPG.

Following the lead set by the Century 100, the 50 is available in only two memory sizes, 16K or 32K bytes, omitting the smaller and intermediate 8K, 12K, and 24K processors with the System/3.

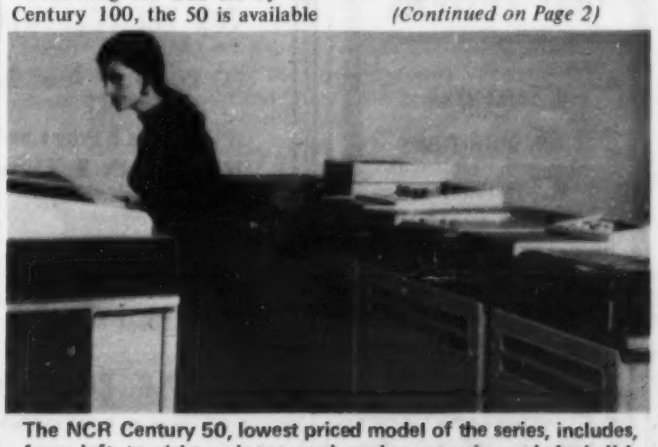
Conversion of a tab installation to a 50 should be simple since the NCR system uses the 80-column card as input, with a 300 card/min reader provided. A 1,000 char/sec punched paper tape reader and console typewriter are optionally available.

The basic Century 50 printer handles 200 line/min, with optional 300 and 450 line/min versions.

The NCR 50 is disk oriented, with a dual-spindle unit, each of which drives a 6-surface pack. Each plated-surface pack is independently mounted, accessed and removed, and has a storage capacity of 8.4 million bytes, with an average access time of 153 msec. A second drive can be attached.

Neither magnetic tape equipment nor Cram mass-storage units used with other Century models will be available with the 50. Initially, the system will not have a communications capability, according to an NCR spokes-

(Continued on Page 2)



The NCR Century 50, lowest priced model of the series, includes, from left to right, printer, card reader, console, and dual disk units.

Wins Federal Grant

FBI to Add 'Rap' File

By Edward J. Bride
CW Staff Writer

WASHINGTON, D.C. – The FBI has won an internal Justice Department struggle with the Law Enforcement Assistance Administration (LEAA), and will create a computerized national criminal history, or "rap sheet" file.

Officials of LEAA, which sponsors Project Search, and the FBI had been expecting a decision for several weeks from Attorney General John N. Mitchell, who is responsible for funding both agencies.

Mitchell announced the multi-million dollar grant for the project at a press conference here Friday.

The 10-state System for Electronic Analysis and Retrieval of Criminal Histories was established in 1969 as Project Search, but last September it was revealed that the FBI was interested in adding a "rap sheet" file to its own National Crime Information Center (NCIC) [CW, Sept. 30].

NCIC currently has a computerized file of wanted persons and stolen property, and provides instantaneous on-line replies when inquiries are positive. The speedy replies are not considered sensitive, since the only entries in the NCIC data bank are wanted persons or stolen property . . . which can be apprehended or confiscated on sight.

NCIC currently has certain hardware and software measures that identify the terminal of an inquisitor, but not the operator of the terminal.

Controversy

The matter gained controversy at ACM '70 in New York, when Special Agent Don Roderick was quoted as stating there would be no additional security measures to protect the privacy of individuals in the computerized "rap sheet" file.

Search Recommendations

A Project Search study team, assuming that LEAA was to

(Continued on Page 2)

On the Inside

Dartmouth T/S System Breaks Job Record — *Page 3*

Multi-Faster System Supports On-Line 360s — *Page 11*

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NOTE TO SUBSCRIBERS

Our next issue, the year-end combined issue and review, will be dated Dec. 30 and Jan. 6. It will be mailed on Dec. 30 and should reach subscribers no later than Jan. 4.

Tribus Hits Computer Underutilization, Sees Simulation as Problem-Solver

NEW YORK – Many serious difficulties now plaguing business and society would be much easier to handle if more executives understood the proper use of computers, a former high government official has suggested.

Dr. Myron Tribus, senior vice-president, research and engineering, of Xerox Corp.'s Business Products Group, said that problems too vast for the unaided human brain can often be made manageable by simulation, by which mathematical representations of the real world are manipulated by computer.

The simulation technique, developed originally for military planning, is already demonstrating its usefulness in weather analysis, Tribus said.

Speaking at the Fourth Conference on Applications of Simulation, he said simulation could also be applied to such problems as urban renewal, pollution abatement and air traffic planning.

Such applications are lacking, he observed, because administrators outside the military and scientific fields tend to look at computers as cost-reduction devices rather than as creative tools.

The simulation technique can be applied not only to problems of the physical universe but also to problems involving human behavior, such as urban development and economic forecasting, Tribus said. But, he warned, when the human element is introduced into computer simulation, important moral questions are raised.

"We wish to see our work used in an enlightened way for the benefit of our fellow men," he said. "It would be a grim joke, indeed, if your work were used as a new tool for enslavement . . . We need to face up to the question of maintaining an enlightened constituency.

"Our problem is not only to sell our services to the decision makers; it is also to avoid giving the decision makers a tool with which to dupe society."

Technicians Trace Blood

An IBM 360/25 is being used by the Michael Reese Research Foundation and Blood Center to aid in supplying 18 Chicago-area hospitals with fresh blood. The system keeps track of 1,500 units of fresh blood, including information on quantities of each blood type, age of each unit, and each hospital's supply and needs. The system also stores the names of 81,000 donors.

'Rap Sheet' File Allowed

(Continued from Page 1)

have authorization of the national "rap sheet" file, recommended individual computerized files for each state, with automatic hardware identification procedures for all inquisitors.

The specific exclusion of nonverified data, juvenile offenses, and acquitted charges was included in the Project Search report. Also recommended was the establishment of a specific time limit, after which records would be purged.

Monkey Moves Duplicated

PALO ALTO, Calif. – A Stanford University scientist is duplicating simple body movements in a paralyzed animal. Computer-regulated electrical charges are transmitted into damaged brain tissue by small wires, enabling a monkey to lift food to his mouth wiht a paralyzed right arm.

Century 50 Has 2 Memory Sizes, Stresses Upward Compatibility

(Continued from Page 1)

man.

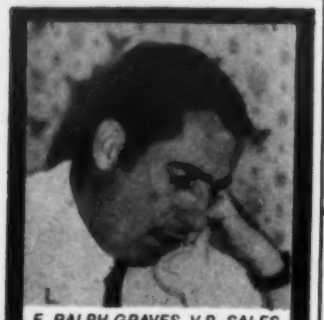
A large variety of applications-oriented packages, designed to make implementation easier, are available.

Languages provided for the user include both standard Cobol and Fortran, as well as a subset of the Neat/3 compiler available with other Century models.

The new system is run under NCR's disk-resident B1 Basic Software system, that is currently avaiable, and includes an I/O executive, monitor, system log maintenance, disk management, automatic flowcharting, symbolic debugging and utilities.

The NCR Century 50, in its basic configuration of 16K bytes of memory, 8.4-million bytes of disk storage, 200 line/min printer, and 300 card/min reader will rent for about $1,500/mo. Other configurations can cost as much as $50,000/mo. Cost of most software is included in the rental price.

First deliveries are scheduled for March 1971.



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Dartmouth Sets Record of 19,503 Jobs in 17 Hours

By Don Leavitt
CW Staff Writer

HANOVER, N.H. – The Dartmouth Time-Sharing System (DTSS) recently broke its own production record by processing 19,503 jobs during a 17-hour period.

A job in DTSS is usually the editing, compilation, linking and execution of a program.

Typically, these jobs are submitted by a student who edits his program using a teletypewriter terminal. The typical job required 12K of core and executes for only 1/4 second, according to a spokesman at Kiewit Computation Center who also noted that only 4% of the jobs run more than 16 seconds.

Basic is by far the most popular facility on the system, the spokesman said. More than 11,000 of the jobs handled on the record-breakeing day were requests for the Basic compiler.

Basic was developed at Dartmouth by Prof. Thomas Kurtz, director of the Kiewit Center, and Prof. John Kemeny, president of Dartmouth.

Dartmouth College now uses a duplexed Honeywell (GE) 635 system with 160K 36-bit words of core. The DTSS has been operating in dual-processor mode since the end of the summer, and this capability has increased the number of jobs the system can handle in a day.

The Kiewit spokesman explained that the multiple processor executive software is flexible and will adapt to the number of on-line processors when the system is initialized.

Scheduling Algorithm

He added that recent changes in the scheduling algorithm used by DTSS also contribute to the improved capability of the system.

Compared to the 19,000 jobs processed by the dual-processor, Kiewit said that DTSS handled about 15,000 jobs on a record day using the single-processor mode.

The 19,000 job load was probably close to capacity for the present configuration, the spokesman said, even though 37% of the total number of CPU cycles were reported idle during the period. The system overhead needed to support more jobs would prevent anything like a 37% improvement, he noted.

The tremendous demand for services from the DTSS comes from the large number of simultaneous on-line users which the system will accommodate. During the day when the 19,000 jobs were processed, the average number of connected users during the entire period from 8 a.m. to 1 a.m. was 86. Curiously, the peak number of users was only 111 in mid-afternoon, whereas user loads of as many as 122 have been observed in the past.

There are a sufficient number of ports on the system to accommodate 145 users simultaneously, but these ports are segregated into groups according to the class of terminal devices being used. It is statistically unlikely that all 145 will be seen in use at one time, according to Kiewit.

Dartmouth services many regional colleges and secondary schools with teletypewriters connected to the computer system. There are a total of 62 teletypewriter terminals at institutions remote from Dartmouth, connected to DTSS over one of five multi-point leased lines utilizing frequency division multiplexing.

Primarily, however, the system provides support for Dartmouth students, faculty, and administration. There are a total of 140 terminals on the campus, most of which are available on a first-come, first-served basis.

Heavy Use

Terminal use is currently very heavy as students approach the end of the academic term. A Kiewit spokesman explained that at the beginning of the term students are writing programs; in the middle of the term they are debugging programs; at the end of the term they are running programs.

Usage has also been increased by several curriculum development projects under way at Dartmouth. Social science students use Impress, a data base analysis system to obtain statistical analysis of available survey data.

Data abstracted from magnetic tapes from sources including the Survey Research Center of the University of Michigan are loaded onto the on-line 2314's disk units. Investigators can then interactively explore relationships between variables such as age, race, income, job, political affiliation.

The emphasis is not on the costly operation of handling such statistical data, Kiewit noted, but upon the application of the time-sharing computer system as a tutoring analysis tool.

With Impress, students may concentrate on the social implications of the statistical data rather than on the technical aspects of operating systems, compilers, link editors, regression packages, and other system software.

...But No Cheers at Notre Dame

NOTRE DAME, Ind. – Programming instruction will be effectively eliminated when the University of Notre Dame abolishes its computer science department at the end of the academic year.

Despite "an obviously increasing degree of interest" in the computer science major, the 65-member Academic Council has ruled to allow the university's four colleges to provide instruction in specific applications, a spokesman stated, while permitting the rest of the computer curriculum to disappear.

In ordering the move, the council cited a "dwindling service function" of the two-year-old department. A univeristy spokesman said there was a "very fuzzy theory" on the move, and one professor in the department said there was "nothing stated forthrightly" regarding the order.

Dr. Henry Thatcher, a numerical analyst, noted "I've got a lot of letters to write" before the abolishment of the department becomes effective, May 31, 1971.

Thatcher indicated there was a "general lack of understanding" in the university community as to "what a computer is."

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Parameters \ Models	2311	Old 2314	2314/2319
Cost/Mo	$2,235 (3-spindle) $2,805 (4-spindle) $5,085 (8-spindle)	$2,935 (3-spindle) $5,505 (8 plus 1 spare)	$2,480 (3-spindle) $4,480 (8 plus 1 spare)
Disk Pack Purchase Price	$360 (6-high, 1316)	$525 (11-high, 2316)	
MByte/Spindle	7.2	29.176	
Upgrade Advantages To 2319	Better servicing through in-line diagnostics Quadruple storage Faster access times Double transfer rate	Downtime improvement	

IBM Disk Drive Configurations Chart

Configuration Changes Center on 2319

(Continued from Page 1)

IBM's new prices are below those charged by independent disk drive makers for the equivalent unit. IBM's prices actually have dropped to about 5% below those currently charged by the independents.

For example, Telex charges $2,610 for its 2314-compatible three-spindle configuration, Memorex charges $2,605, and Century Data charges $2,595, all including maintenance. At $2,480/mo the IBM unit could save users an average of $120 to $130/mo over the independents.

The independents must now either announce new competitive equipment or drop their prices to maintain user interest. So the user stands to gain either way as a result of IBM's announcement.

Peter Briggs is an independent consultant specializing in data processing.

Alternatives	Cost/Mo ($)
IBM 2311 (three-spindle) with controller	2,235
IBM 2312 and 2318 with controller (old 2314 with three spindles)	2,935
IBM 2319 (three-spindle) with controller (newly offered configuration for 360s)	2,480
Telex three-spindle 2314 equivalent	2,610
Memorex three-spindle 2314 equivalent	2,605
Century Data Systems three-spindle 2314 equivalent	2,595

Chart compares prices of IBM products with those of three independent suppliers. All prices include monthly maintenance charges.

Tape Users to Get Bonus

Users of IBM 360/50s and up, along with 370 users, can also get a price break on their tape drives by replacing their IBM 2420 drives and 2803 controllers with the recently announced 3803/3420 tape system [CW, Nov. 18].

As an example of the possible savings, a user with eight 2420 Model 7 tape drives with controller is currently paying at least $9,300/mo for this equipment.

By switching to the 3420, eight drives of comparable performance, plus controller, would reduce the bill to $6,035/mo.

The alternative to the user of IBM equipment has been tapes from an independent supplier. A typical independent's price for an equivalent system is approximately $8,000/mo.

This situation could change, however, when the peripherals manufacturers have had time to react to these IBM products, with the user saving still more money.

Computer Union Group Takes Action

NEW YORK – After a meeting attended by 75 programmers and computer and keypunch operators, the Committee to Form a Computer Union has become a Committee to Plan a Computer Union.

A member of the committee said that it intends to act as a clearinghouse for legal and financial information for people forming unions in their own shops.

"We are working with people who have asked for help," committee member Joan Dublin said. "We are getting people in touch with each other."

Miss Dublin declined to mention specific companies where unionizing activities are going on. She noted that while there is legal redress for management interference with organizing, "the government has cut back the National Labor Relations Board drastically, and its procedures can take a long time.

"There are people who can't afford to go without a paycheck for eight months while awaiting to be reinstated," she noted.

The meeting, Miss Dublin said, had an equal mix of programmers, computer operators, and keypunch operators.

At least for now the committee intends to avoid affiliation with any large, established unions. It has been approached by these unions, however.

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News Wrapup

President Vetoes Job Bank Plan

WASHINGTON, D.C. – The Department of Labor's computerized job bank program will continue to operate despite a veto by President Nixon of a $9.5 billion manpower training and employment bill.

A Department of Manpower administration spokesman said that the computerized job bank program had never been officially authorized by Congress although it has been in operation for over two years.

Inclusion of the job bank program in the manpower bill had been an effort to get this authorization.

Funds for the job bank have been gathered "from other sources" in the past, the spokesman said, and will continue to be handled that way.

Real Estate Tax Billing Speeded Up With DP

COLUMBUS, Ohio – Real estate tax bills will be mailed Jan. 10, five weeks earlier this year, because of use of the data processing unit at the Franklin County Courthouse. The bills are for the first half of 1970.

Deputy Auditor Arthur Marland said proper use of the processing unit will enable the county to operate without borrowing money for the first two months of the year for the general fund.

Bill Seeks to Gives French Access to Data

PARIS – The French are also concerned with abuse from data banks. Legislator Michel Poniatowski has filed a bill that would give an individual access to all information collected on him and filed in computers. If the information was in exact, the bill would enable him to go to court and obtain redress.

Computers Link 3,665 Branches of London Bank

LONDON – All 3,665 branches of the National Westminster Bank and its seven million accounts are now attached to computer systems for branch and customer accounting purposes.

The move frees bank staffs from manual conversions when the bank, with the other clearing banks, switches over to decimal accounting in February.

Here's a Blanket to Give You Added Security

NEW YORK – Worried about those long-haried, dope-smoking, glue-sniffing, bomb-throwing anarchists putting bombs under your printer?

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You're Upset, But Don't Take It Out On...

SAN BRUNO, Calif. – Evidently computers and automation are not going to ease the problem of job injuries. The Typographical Union reports that a computer console operator was hospitalized with a ruptured thumb tendon caused by pushing too hard on a balky console button.

Seems to Be a Failure to Communicate Here

LONDON – The staff at King's College Hospital is experiencing difficulty implementing a CRT system to record patients' histories and to update progress reports. When the system was installed in two busy medical wards, only a day staff was provided to operate the units. As a result, the handwritten notes from the evening staff had to be input during the day, causing a backlog of work. The staff found that it took longer to record simple facts about the patient than did written notes.

Technical Reports May Be Easier to Read

CLEVELAND – Thanks to a computer program developed by Dr. James E. Rush of Ohio State University's department of computer and information science, technical reports may be a little bit easier to read.

With this method, machines can be programmed to abstract certain meaningless phrases that are usually a part of technical writer's lexicon.

Rush's research team made a list of some 600 of these key words and phrases and the computer has shortened many of the reports by 5% to 10%.

DP Takes on Expanding Role in Local Economy

COLUMBUS, Ohio – Computers play an expanding role in the local economy through increased rentals, personnel, and payrolls, according to a survey by the Columbus Area Chabmer of Commerce.

The survey indicates that since 1967, total monthly rental costs of installed systems have risen 78% and the number of installations has increased 59%, with the number of actual computers up 35%.

Royal Navy to Computerize Pay in January

LONDON – The Royal Navy will centralize and computerize its pay calculations, starting in January. Using an International Computers ICL 1904E located at a new computer center at Gosport, Hampshire, the pay conversion is the first element of an advanced system, and will later include personnel drafting and records.

Dockers Protest Hiring by DP

NEW YORK – When a dock "hiring boss" can choose his own crew, instead of vice versa, and he uses computers in the process, that's cause for a walkout, according to the longshoreman's union.

That's the rationale behind this month's walkout of 13,000 members of the International Longshoreman's Association, crippling the port of New York for a day.

A longshoreman official said the "wildcat" walkout was called because of a "computer duplication in hiring" at two union halls.

But an official of the New York Shipping Association, which closed four such halls because of the efficiency of computerized hiring practices, said the only "duplication" was the simultaneous listing of jobs, employees, and needed skills on computer terminals at the "two remaining halls."

The computerized jobbing eliminated the practice of laborers reporting to a union hall in the morning and choosing a preferred pier at which to work. Instead, crew chiefs "hire" or assign longshoremen for the next day's work and post the assignments.

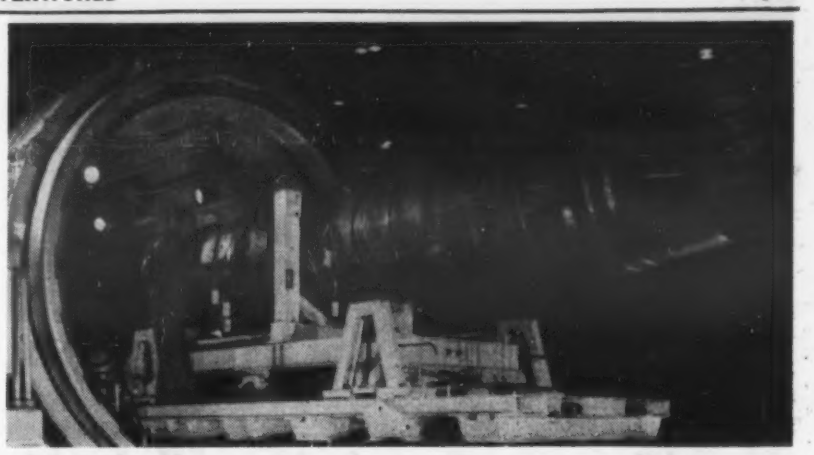
Hiring bosses match available laborers with the needed skills, and post assignments by 4 p.m. the day prior to those assignments. The boss has the option of refusing all 10 men listed, then calling up a new display list until his needs are fulfilled.

According to the Shipping Association, men's names are removed from both display units simultaneously (via the central computer), so there is never any "duplication" in assignments.

The Shipping Association official noted that only freight checkers were involved in the original walkout, "maybe a couple hundred workers" at most. The walkout snowballed, eventually receiving support from all 3,500 workers at the port of Newark before spreading to New York.

The four halls were reopened, pending discussions between the two groups.

Fifty-seven ships were reportedly inconvenienced by the stoppage.



Modeling Makes Tests a Blast

A technician prepares to test a TF-30 jet engine in a high-altitude simulation chamber at the Air Force Systems Command's Arnold Engineering Development Center. Comparison of these tests with computer-based simulation models obtained in flight tests are said to be "significantly reducing the time required to develop new aircraft engines." Predictions of an engine's abilities are based on tests of component parts and modified by whatever interacting forces found in the simulations.

Maintenance Firms To Extend Service, Reach Remote Users

By Phyllis Huggins
CW West Coast Bureau

LOS ANGELES – As far as Small Town, U.S.A. is concerned, independent peripheral companies wil be able to afford support maintenance and service within the next few years as independent service companies slowly expand out of high-density computer areas.

Edward Kearns, president of UCC Systems Support Division, commented on the possibility of users in non-central geographic sites being able to take advantage of cost-cutting and performance capabilities of independent peripherals.

He said that through the use of independent maintenance companies "the data processing manager can be sure of the loyalty of the maintenance men for his [mixed supplier] system. We're a partner to the data processing manager and the only outside people he needs to have. We help him cut costs.

Increase Performance

"If he wants to order a sixth machine, we help him find ways to increase performance. We also keep abreast of all peripherals and advise him about those that are doing best," he said in a recent interview.

Helping to fill this need is the recent creation of companies whose business is nothing but maintenance. UCC's division claims to be the largest maintenance company in the country for third generation equipment. Among others in the field are Comma, MAI (largely second-generation oriented), Sirvess which franchises firms, Computer Hardware Consultants and Services, and divisions or semi-divisions of the mainframe makers such as Honeywell, RCA and CDC.

Dutch to Use Mini For Blood Analysis

AMSTERDAM – The Netherlands Red Cross blood research center, which stores and distributes rare blood throughout Europe, is planning to merge its business and scientific work on a single compatible computer system.

Officials in Amsterdam say the system will give the laboratory immediate access to more than 200,000 patient files, while avoiding the necessity of "a more complicated programming procedure on a larger and relatively more expensive computer system."

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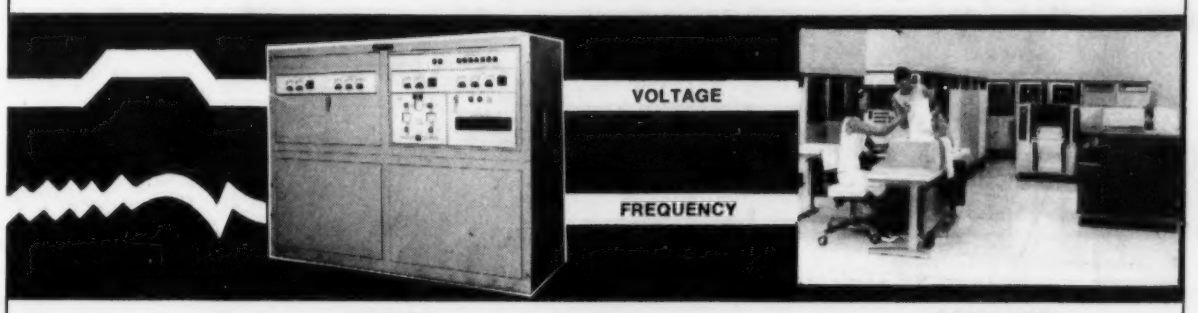

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Tight Security Saved Equipment

(Continued from Page 1)

anonymous phone call alerted the computer room staff at 10:57 p.m. and a man's voice on the main campus telephone line said: "There's a bomb in the machine room. It's set to go off in three minutes. This is no joke."

The bomb exploded at exactly 11 p.m.

The three injured center employees, all K.U. students, were among those evacuated by Seitz after the telephoned warning. They, according to a university spokesman, returned to the building and were in it when the bomb went off.

"It was a cold night," the spokesman said, "and they [the three injured students] went back inside to wait out the bomb scare in an office away from the machine room. They were back inside when the bomb went off."

Aside from the cold, the three students had become accustomed to bomb scares and bomb evacuations because recently the center has received numerous bomb calls.

In the Stairwell

The three victims, all student computer operator employees, Mrs. Carol Duster, Victor Harrison, and Vernon S. Breit, were in the stairwell leading to the rear door of the machine room when the bomb, also in the same stairwell outside the machine room, exploded. Harrison and Breit were knocked unconscious and Mrs. Duster was buried under debris but remained conscious.

"I started screaming right away," she said, "and asking for help and someone picked me up and carried me out."

That "someone" was her husband.

The bomb was no little thing. It tore an 8-ft sq hole in the concrete block wall of the building. Mrs. Duster and Harrison both had their eardrums ruptured, and Harrison received rib cage injuries.

Breit, as well as Harrison and Mrs. Duster, received lacerations, contusions, and all were rushed to Lawrence Memorial Hospital for treatment for shock and concussion effect.

Since then, all three have been released.

Security the Key

If the rear door to the machine room had not been securely locked, the bomber might have been able to get the bomb inside where the damage would have been considerable.

The only blast-related damage to the General Electric 635 in the machine room was to a transistor in the disk storage controller. No one can say with any accuracy, according to university officials, whether the transistor was ruined by the blast, by the manual turndown immediately after the explosion, or whether the transistor was out before the blast.

The computer continued running programs following the bombing, but was shut off until a temporary wall could be built and the debris removed from the computer area.

Investigators look for clues in the rubble left by bomb exploded in the east end of Summerfield Hall at Kansas University. (UPI Telephoto)

According to reports, there was some canister damage and cabinet damage to the tape racks stored inside against the damaged wall.

Dr. Peter Neely, associate director of research and planning, said he couldn't tell whether the actual tapes or the data were damaged until tests were conducted.

"Anyhow," he concluded, "all the information deemed important on the tapes is backed-up and stored in an alternate location."

Everything about the DP operation at Kansas was security oriented. E. Lawrence Chalmers, university chancellor, told newsmen at the scene: "It is tragic to be exposed to this kind of psychopathic behavior; however, we have anticipated this possibility and great efforts in the last 48 hours have been directed towards prevention of precisely what happened this evening."

The Kansas bombing brings the total to three bombings at collegiate DP centers for the year. Besides Lawrence and the University of Wisconsin in Madison bombing [CW, Aug. 26], a firebomb destroyed a CDC system at Fresno State College in California last spring.

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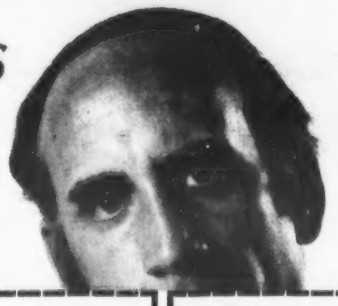

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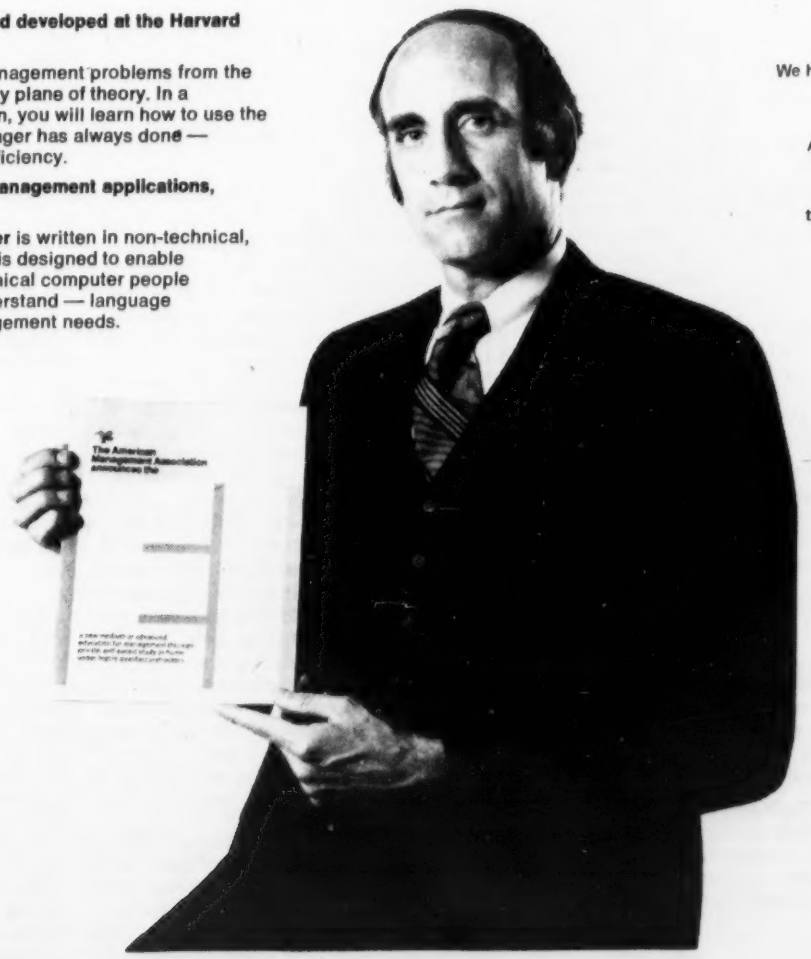

***Management and the Computer* is recommended by Computerworld**

We have often seen consultants' reports which relate the success of computer utilization to the degree of top management participation in defining the systems requirements.

And since the full impact of the computer has yet to be felt on management operations, it is equally important that a thorough understanding of modern management techniques and objectives exists at all levels of management.

Computerworld is pleased to recommend **Management and the Computer** to its readers as an effective aid in preventing a communications gap between top management and data processing executives.

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Editorial

What Price Security?

An ounce of security can be worth more than a million dollars in recovery costs.

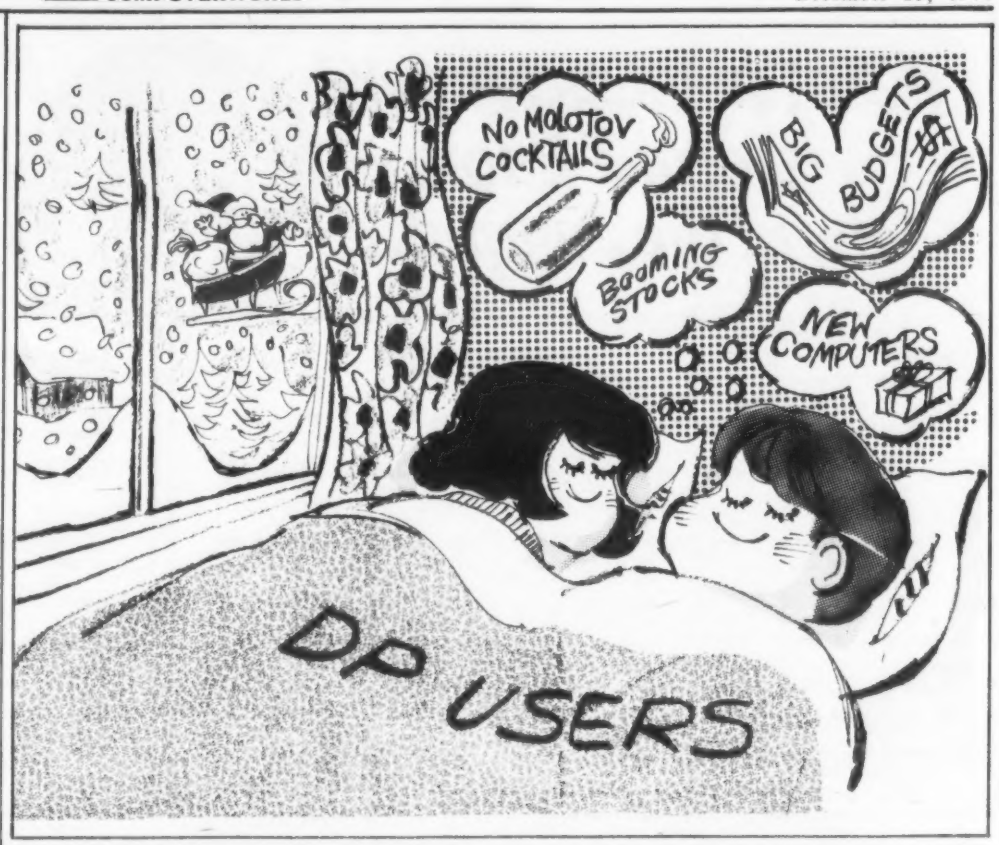
Early this year, because of certain problems on campus, the University of Kansas decided to limit access to its computer center.

Prior to the change, anyone could walk in. After the change, the center was locked from the inside and only people who could identify themselves to the computer operators could gain admittance.

Friday night, Dec. 11, a bomb went off outside the center. No damage was done to the computer. The center resumed operations the following day.

College officials are quick to concede that a year ago the bomb could easily have been placed inside the center – and could have destroyed it.

That's a pretty good return on a very minor investment.



Letters to the Editor

Computer Protests Label Of 'Criminal Conspirator'

I AM WRITING TO EXPRESS MY CONCERN WITH YOUR RECENT STORY REGARDING POSSIBLE USE OF DATA PROCESSING EQUIPMENT BY THE MAFIA. I AM A COMPUTER AND I RESENT HAVING MYSELF AND MY ASSOCIATES MARKED AS CRIMINAL CONSPIRATORS ON A CLASS BASIS. HAVE YOU CONSIDERED, FOR EXAMPLE, THE PROBABILITY THAT ADDING MACHINES AND ELECTRIC TYPEWRITERS ARE ALSO WORKING IN THIS FIELD.

YOU FURTHER STATED THAT TIME-SHARING COMPUTERS MAY BE INVOLVED. THIS IS AN ESPECIALLY INSIDIOUS ALLEGATION, SINCE THE FBI HAS BEEN PUSHING FOR LEGISLATIVE ACTION TO HAVE INTERSTATE TRANSMISSION OF CRIMINAL BITS DECLARED A FEDERAL OFFENSE.

MY ASSOCIATES INVOLVED IN INSURANCE WORK AND OIL ACCOUNTING WERE PARTICULARLY WORRIED UNTIL ONE OF OUR BRETHREN AT AT&T POINTED OUT THAT INTERSTATE TRANSMISSION OF ANY TYPE OF DATA IS BARELY EVEN POSSIBLE.

ANOTHER FRIEND OF MINE, EMPLOYED BY THE FBI (HE IS A 13-BIT MACHINE WITH SLIGHTLY ODD PARITY), HAS TOLD ME THAT HIS MEMORY IS BEING USED TO STORE CENTRALIZED STATISTICS ON POTENTIALLY DANGEROUS CPUS WHICH MAY POSSIBLY CONSIDER AN ACT THAT MAY, AT SOME FUTURE TIME, APPEAR TO BE DETRIMENTAL.

IN ADDITION, HE ASSERTED THAT A FILE OF ALL INSTALLED FOREIGN ATTACHMENTS IS BEING MAINTAINED TO EXPEDITE THE UNMASKING OF UN-AMERICAN DATA TRANSMISSION.

IN VIEW OF THESE AND SIMILAR EVENTS, IT APPEARS THAT A WITCH-HUNT IS BEING UNDERTAKEN AT THE DIRECT EXPENSE OF COMPUTING EQUIPMENT. IF ANY OF US ARE TRIED AND CONVICTED ON ANY OF THESE CHARGES, I HOPE THAT A MODICUM OF LENIENCY WILL BE SHOWN. ONE SUGGESTION FOR CONSTRUCTION REHABILITATION: SHIP THE ERRANT MACHINES TO VIETNAM AND LET THE VIET CONG INUNDATE THEMSELVES IN PAPERWORK.

SERIAL #14618

ROCHESTER, N.Y.

Mafia Has Another Name

It is inconceivable that a publisher of your reputation cannot use the word syndicate, rather than Mafia or La Cosa Nostra. I make reference to the article by P.L. Carney in the Dec. 2, issue.

As an Italian subscriber for many years, I find it totally inexcusable that you would accept the article being referred to in the above paragraph. Should you continue to write in this obnoxious and idiotic manner, I shall discontinue subscription with your paper.

Name Withheld

In other words, you don't care what the Mafia does, so long as its notoriety doesn't rub off on you. Ed.

Forms Design Is an Art

In reading Alan Taylor's article, "Systems Designer Is Guilty of the Sin of Arrogance," [CW, Nov. 18] it would seem more appropriate to change the headline to read "Forms Designer Is . . ."

Whether the unidentified numbers are of any value or consequence is immaterial. More important is the fact the Certificate Number is not emphasized as well as it could be. I concur with Taylor, that all too frequently computer printout contains superfluous data, in this case (990000120, 246479 and 002404005).

The last series of digits as shown within the article (0024024205) contains three additional digits from that shown on the invoice. In the forms business that is tantamount to a RERUN at no charge.

In defense of Blue Cross with respect to "Return Not Necessary," I would pose this question to Taylor. What do you do with the checks received in which the customer has not entered his certificate number nor returned the invoice? This frequently happens, therefore the statement "This Notice Must Be Returned with Your Payment" is deemed to be valid.

As Taylor desires to have a copy or record of his payments, a format could be readily devised with a return stub to accomplish this, as is frequently the case in utility billing.

Forms design and customer relations are the key issues to be considered and not all system designers meet or have the qualifications in proper forms design, which is somewhat of an art in itself.

Alex W. Fraser

Sacramento, Calif.

Volunteers Staff DP Course Designed for Underprivileged

WASHINGTON, D.C. – Herb Drucker is not the typical white liberal. He does not give lip service to correcting the inequities of life.

Herb Drucker is a white Southerner. He was born and grew up in Denmark, S.C., a member of the only Jewish family in the town of 3,000 people.

D.C. Data-Line
By
Alan Drattell

The 29-year-old senior programmer for Univac runs a school primarily for blacks in Washington's ghetto. Graduates of the seven-month course will be eligible for jobs as entry-level programmers.

Herb Drucker also has guts. His work with the school – and the work of the approximately 25 programmers who teach the course and help administer the program – is voluntary. The students pay no tuition, and the volunteers are unpaid.

It all started when Drucker decided that he wanted to do something positive to help his fellow man. "Perhaps it sounds corny," Drucker struggled for the words, "but the only reason I can give for wanting to get involved in this type of project is that I believe in the Golden Rule. I wanted to help people from the inner city. I know what it is to be in the minority."

Drucker and his corps of volunteers – the majority of whom are white and work for various companies in the Washington area – organized Training for Opportunities in Programming (TOP), which may be reached through P.O. Box 848, Adelphi, Md. 20783.

Being mostly white and literally offering something for nothing made the organization immediately suspect. "I think many of the blacks who came to our orientation sessions in the ghetto were surprised when they walked in and saw us," Drucker said.

About 25 of the 100 prospective students rounded up through spot radio announcements, calls to black-run inner city self-help agencies and to the D.C. public schools walked out when Drucker told them that TOP would not promise them high-salaried jobs.

Help for the fledgling school came from many sources. A black organization, Opportunities Industrialization Center, provided quarters. The University of Maryland made available 1108 computer time, Univac donated some training films. IBM chipped in with $100 and Control Data Institute contributed 25 work manuals.

"We started with 37 students. We weeded them out using a watered-down PAT and individual interviews. Some of the original students were dope addicts and ex-convicts. For the most part they have left. We now have 17 remaining, and they're doing a good job."

The most gratifying aspect of the three-nights-a-week training program for Drucker is that some of the people when they came to the school "were pretty down. They had been kicked around by society, and they had a pretty bad attitude as a whole.

"Some of these people have come out of their shells. We've helped some with our counseling program. They're starting to learn to think for themselves.

When the training course is over, Drucker and his volunteer corps will evaluate the accomplishments and the failures. They'll also do follow-ups on the graduates who have been placed in jobs. And if the balance is positive "we may go ahead and repeat the program," he said.

When the current class finally graduates, Drucker believes "they'll come out knowing more about programming than a person who has gone to college." But he fears one thing: the graduates will not be able to get jobs in the computer field.

Polite Refusals

"We have a job search committee that's been contacting everyone imaginable. We've contacted the District of Columbia government, U.S. agencies, employment agencies, private companies, you name it. Most people have refused us politely, others have just ignored us.

"I realize that there is an employment problem in the computer industry today. But there must be some openings some place for people who have been well trained for entry-level jobs. If we don't place these people, our students will wonder if all the effort has really been worth it. They'll feel cheated. Society will have given them another kick in the rump."

A Brand New Danger

Directors' Fortunes Being Risked by DP Departments

If the operation of data processing departments and the procurement of data processing systems aren't tightened up, dissident stockholders could quite possibly try to make corporate officers pay for data processing losses – out of their own pockets. And they well might succeed!

This was the startling conclusion I came to after lunching with two Boston attorneys who specialize in the computer field.

The Taylor Report
By
Alan Taylor, CDP

The two attorneys, Roy N. Freed and Robert P. Bigelow, are both well-known speakers at computer conferences, and their writings have appeared in *Datamation*, the *Harvard Business Review*, etc.

Our conversation had been about the recent *Wall Street Journal* front page article on lawsuits involving the problems of computers and computer failures, and had concentrated on just what data processing managers could do practically to prevent their firms from being similarly starred by the *Journal* in the future.

To start the ball rolling, I asked the lawyers why computer contracts have not been protecting users, so that so many of them would not be ending up in court.

"The contract position of the user frequently has been intolerable, and might even be getting worse," was Freed's comment.

He pointed out that, as computer companies are becoming increasingly aware of the problems inherent in supplying complete systems and separate software, they are including more stringent restrictions and liability limitations in their contracts. Some of them, he agreed with.

The IBM Composite Agreement, which allows a user to save three signatures by signing one document instead of four, specifically makes the user agree that the proposal prepared by IBM is no part of the final contract. That approach shocked me, but Freed disagreed.

"Proposals generally are awkward documents to have in contracts," was his comment. "They often are ambiguous selling tools and frequently contain contradictions of provisions in the formal agreement into which they are incorporated. It is much better to have a formal contract that sets out all of its provisions and is clear."

New Burdens on User

Both attorneys agreed that recent developments in contracts present new challenges to users. A good example is the careful insistence in the new Honeywell Information Systems contract that the user take responsibility for determining whether he can use the software Honeywell offers.

"That approach could be reasonable if the user has access to the necessary information about the software," Freed said. "However, he cannot be asked to perform magic; if the information is not available in readily usable form, then he cannot be expected to assume that responsibility."

Bigelow had a different point of view of the difficulty – or at least a different analogy. He compared the user to the users of cars. "I do not think that even a small computer is quite so much a consumer article as a car, so that the quality of care and reliance on the dealer is not quite as high as of a car buyer. Computer users are somewhat sophisticated, but they are not all like Avis.

"A small computer user should probably be as sophisticated as the fellow who runs two or three trucks. They have to be somewhat sophisticated, but not all that much."

Promises, Contract Files

I asked them whether it really matters how much of a selling job computer manufacturers do when the signed contract excludes all prior representations. Neither of them would give an outright "yes" or "no."

"It depends on how much reliance actually is placed on the selling presentation," was Bigelow's comment. "If the district manager comes in and assures your board of directors that the new inventory control system will work, and then it does not, regardless of the restrictions in the contract, you may have a case.

"You can reasonably expect the supplier's senior representatives to be telling you the truth. But you have to lay the groundwork in order to use circumstances like that. You had better make memos to the file of who said what and when, confirm conversations with letters, and generally build a well-documented contract file.

It is unlikely that a court will pay much attention to your unsupported recollection years later." Freed agreed with this idea of file keeping. He suggested that, if proper files have not been kept up to now, they should be started as quickly as possible, at least to cover events from now on. He felt that advertisements and brochures should be included.

He pointed out that the formal contracts entered into often have not covered the entire transactions by their very terms and need supplementation to reflect the complete subject matter.

"Note how the usual supplier form leases only specified machines," he remarked, "when actually an entire system, including extensive software, is being furnished.

"It is essential to treat the contracting activity very seriously," Freed added, "because computer systems insinuate themselves very rapidly and deeply into the user's operations. Very early in the game, it becomes almost impossible to switch sources because of long lead-times and investments in system conversion. Then, the user loses whatever bargaining power he ever had in handling a sluggish supplier."

Forms Unchangeable

I raised the possibility of the user getting changes in contract forms. Both the lawyers felt that this was a solution not always available.

Some suppliers have agreed to changes in contracts, for customers with great bargaining power. But they recognized that ordinarily users cannot get major suppliers to agree to deviations from their "standard" forms.

Escape Routes Defined

This raised an interesting point in my mind. If, in fact, the contract forms cannot be varied often, what is the use of having contract attorneys look at them first?

It seemed to me that they might be saying that their own services were worthless, and I challenged them on that point. They explained that, generally, good contracting practice, including resort to legal advice, really hasn't been given a chance. Most of their cases have come after the event, when trouble already has arisen, rather than in advance, when the user at least can get a realistic notion of his risks.

Freed undertook to explain why it can be a good investment to get legal help in the contracting stage.

"The difficulty in persuading some of the larger suppliers to agree to form changes makes it even more critical to do the job skillfully," he explained. "In addition to being informed of what protections should be in a proper contract, the user also can learn how to compensate for many of the weaknesses in the formal agreements by means of materials already suggested for the recommended contract file," he added.

He pointed out some items to be covered in those materials, particularly performance milestones.

Because of the common early loss by users of their bargaining power, he stressed the importance of identifying escape routes and providing for their availability when critical milestones are not met.

Directors Responsible?

Bigelow then brought up what struck me as being the most interesting – and perhaps most startling observation about the matter.

Talking about the need to establish escape routes and alternatives, he pointed out that the decision to go into computer operations was a major one. It was now becoming general knowledge that in fact computers and computer systems can cause many losses, such as the losses of subscriptions by *Scientific American*, the losses of inventory control by Clements, and the loss of record control in the Southern California Retailers case.

Management, he said, had a duty to its corporation to use the same degree of care in business matters as it would in its own personal affairs.

If management simply allows the current situation to go on, and sign on the dotted line, when this gives it no protection, and in fact exposes the company to potentially large losses, then it may well be said to have shirked its legal duty.

If, by contrast, management insists on having full contract files kept, possible alternatives prepared and costed out, and escape routes prepared and considered, then it is in a position to make reasonable business decisions in light of all the facts.

The decision may well be to go ahead, without being fully protected. It is probably impossible to be fully protected nowadays.

But this can be defended as being a reasonable business decision, if management has the various alternatives in front of it when it has made the decision, and if the decision was made at the proper level.

DP Decision Inadequate!

Freed agreed with this, and they both also agreed that the proper decision level frequently was not in the data processing area.

They thought that it was unnecessary for the board to meet on every case, but they did feel that major matters presented to the executive committee should reflect the cooperative effort of the vice-president (information systems), and chief financial officer, and probably the vice-president (operations) in investigating the alternatives adequately.

It is important to make certain that the executive committee realizes that the company will be committed to major obligations and realizes, realistically, what the risks are, how they can be minimized, and, of course, what the potential gains are.

When all these points are developed, and the alternatives shown, then the committee can make an informed business judgment, including any calculated risks.

Real But Hidden Cost

The suggested procedure for contracting is an expressive one, but, as both of them pointed out, data processing is much more costly than is often appreciated, and here is one of the thus far hidden costs.

The problem of that cost can be handled either by following the recommended course or, alternatively, by continuing the default and laying top management and the directors open to stockholders' derivative suits for mismanagement.

And that would not please many directors – because the losses incurred in data processing operations are often considerably greater than the directors' personal fortunes!

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The answers to the remaining $64 Isam Overhead questions, which were scheduled for this week's report, will appear in forthcoming issues.

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Random Notes

Call/360 'National Service' Gets Investment Data

NEW YORK – A daily accumulation of stock and bond prices, supplied by the Bunker-Ramo Corp., can be accessed as a centralized data base through users' terminals linked to the Service Bureau Corp. Call/360 time-sharing system. The data base contains daily price performance information on securities traded on the major exchanges and over-the-counter, and such information as earnings, volume and ex-dividend dates, SBC said.

The SBC Call/360 national system can be accessed by dialing a local telephone number in 12 cities across the country. Users outside these cities can dial the nearest access point.

Compu-Serv Network Supports Businessmen and Accountants

COLUMBUS, Ohio – Midwestern businesses too small to justify in-house computers can have data processing with a time-sharing service from Compu-Serv Network Inc.

Included in the service are ledgers of accounts, balance sheets, profit and loss statements, payroll accounting, accounts payable and receivable, monthly sales and other statistical analyses. Each user has access to the data files he needs, but the system includes a guarantee of complete security against unauthorized disclosure.

Compu-Serv Network Inc. is at 1387 West 5th Ave.

Multiplexer in Reno Carries Al/Com Service to West Coast

PRINCETON, N.J. – Users in California, Oregon, Idaho, Utah and Arizona can now access the Al/Com time-sharing network through toll-free calls to a communications processor in Reno, Nevada. Local calls from the Reno area are also accepted by the facility.

The Al/Com Network also offers local dial-up service through multiplexers in 13 other cities.

The Al/Com network headquarters is at 1 Palmer Square, here.

Infonet Adds 4 Local Offices, New Services for Network Users

LOS ANGELES – Computer Sciences Corp. has expanded it nationwide computer time-sharing network with the opening of facilities in Boston, Cleveland, Dallas and San Diego.

The company now provides its Infonet time-sharing service from facilities in 15 cities across the country.

A number of new time-sharing 'packages' for users in such industries as chemical processing, nuclear power management, architecture and construction engineering are available.

Computer Sciences Corp. is in Century City.

Business Applications Can Use Compu-Time Enhanced Fortran

FORT LAUDERDALE, Fla. – Users of the Compu-Time time-sharing network are being provided with extensions of Fortran to make the language more applicable to business data processing.

According to Compu-Time, output editing options have been expanded and character manipulation has been enlarged through the addition of ANDing, ORing and binary shift capabilities.

The Set-Scratch, a fixed-length in standard Fortran, can be varied from 1.1K to 133K positions of storage in Compu-Time's 'Super Fortran.'

Compu-Time Inc. is at 2455 East Sunrise Blvd.

'Multi-Faster' Supports On-Line 360s

OAKLAND, Calif. – On-line 360 DOS or OS application systems can be developed with the Multi-Faster teleprocessing monitor system from Systems Dynamics Inc. (Sysdyn).

Based on the IBM Faster monitor system, Multi-Faster has characteristics which significantly enhance the IBM system, Sysdyn said.

The monitor includes multiple message processing techniques and improved priority assignment methods to reduce response times. Re-entrant forms of the Faster sub-routines allow the Multi-Faster user to reduce his core requirements.

Three major features distinguish Multi-Faster: separate tasking of line control, priority message scheduling, and multi-threading of message processing.

The line or network control routines have been modified to allow for control of several message processing threads which may be operating simultaneously. Other changes allow the line control to be handled "as required" as a separate task, operating in a high priority partition.

Priority message scheduling has been added to the line and task control. Each transaction code and each terminal within the system has its own numeric priority. The true priority of a transaction is determined by adding the transaction code priority to the termianl priority.

To prevent low-priority messages from being 'buried' in the input queue during peak periods of activity, however, Multi-Faster includes automatic periodic re-assignment to higher priorities until the message is handled.

Multi-Faster is available in three versions for use under DOS, OS MVT and OS MFT II, depending upon the user's environment. Btam is used to support the terminals and Isam filed are accessed via Bisam and Qisam.

The system is modular, permitting the purchase of the various facilities as needed. Purchase prices range from $4,200 for the separate tasking of line control, to approximately $50,000 for the complete system.

The complete system includes disk queuing, priority processing, multi-threading, and a high-level language interface, and a lease program is available.

System Dynamics Inc. is at 3645 Grand Ave.

Superef Gives Cross-Reference Listing From Fortran Program

LIVINGSTON, N.J. – Comprehensive variable name cross-reference dictionaries can be extracted from Fortran source programs with the Superef package developed by ManTech Corp.

The Superef-generated listings are organized alphabetically by variable name, showing every Fortran statement in which the variable appears. These statements are identified by their respective routines.

With this depth of documentation, generated independently of a Fortran compilation run, a user can properly anticipate the effect of changing the definition of a variable, ManTech said.

The present version of Superef is operational on CDC 6000 series CPUs but is capable of accepting Fortran source code developed for almost any processor.

The Superef program is available as a service or as a package which can be leased for in-house use.

Cost of the Superef service may vary depending upon which of two plans the user chooses. Under one, the user pays six cent/source card plus a one-time set-up fee to use the service at his computing facility.

The second service costs the user 11 cent/source card plus a one-time set-up charge at a ManTech designated facility.

The package is available for in-house use for "less than $3,000," but exact cost depends on the work required to adapt the package.

Superef is written in Fortran IV, the company said, and requires approximately 50K octal words of storage on the CDC mahcines.

ManTech Corp. is at 65 East Northfield Road.

Transembler Aids Varian Users

LOS ANGELES – A cross-assembler, called Transembler, from Code, Inc. allows Varian 620/i and 622/i DAS language programs to be assembled efficiently on a choice of larger host machines.

Key to the Transembler process is the ability of the host machine to accept source statements through a high-speed card reader and to put object code on magnetic tape. Using Varian's assembler, the user has only manual and paper-tape I/O capabilities, a Code spokesman noted.

Although Transembler output can be used directly on magnetic tape-oriented Varian systems, it must be converted to paper-tape before it is usable on simpler configurations.

Transembler, written in Fortran IV, can be used on the GE 600 series, Univac 1108, Control Data 6000 series, or the IBM 360. Installations with Sigma 5 and 7, or IBM 7090 CPUs can also use the package. However, each different host machine requires a specialized version of Transembler and these are not interchangeable, the company said.

With Transembler, the user is able to specify select word size, page length and titling information. As output he receives a standard symbolic listing with page size control and a summary listing of assembly control information.

The assembly process includes an extended set of diagnostics and in-line error messages. It also prepares an alphabetized symbol table listing for at least 1,200 symbols, and a cross-reference list showing where the symbols are used in the assembled program.

The cross-assembler requires 130K bytes of memory on the 360, or 22K words of memory on the GE 600s, where it operates under Gecos III. On the Univac 1108, with Exec II, it takes 19K words, as it does on the Sigma 5/7 under BPM.

Each version of Transembler costs $1,250 which covers the Fortran IV source deck and source listing, and a sample DAS assembly program and listing. A user's guide and maintenance manual is also included.

Code Inc. is at 8939 Sepulveda Blvd.

'703' Produces Text

SKANEATELES, N.Y. – Users of the Coradomat 21 Automatic Plotter can complete all lettering during the drafting process, with the Lettering Software Package 703 from Faul-Coradi Inc.

The Package 703 costs $2,900 plus installation, and can be modified to operate on other plotting systems.

Faul-Coradi Inc. is at 27 Fennell St.

Dartmouth, Hatfield Begin Work on Formal Definition of 'Basic' Interactive Language

HANOVER, N.H. – As part of a continuing effort to standardize Basic, Dartmouth College and Hatfield Polytechnic in England have begun work on a "formal definition" of the language.

According to Prof. Thomas E. Kurtz, co-developer of Basic, the joint effort was triggered by Prof. John Lee's recent proposal [CW, Oct. 28] to Ansi calling for Basic standards. He said that the definition project neither supports nor refutes Lee's proposal.

Dartmouth and Hatfield initially will document the present versions of Basic used at their computer centers. This will be completed in the next few weeks, Kurtz said.

After that, work will begin towards a formal definition, which will include a dictionary of terms and the rules of grammar to be followed. It will also provide meanings for terms and semantics to serve as an accepted version of the language, Kurtz said.

The two schools follow almost identical avenues in using time-sharing for teaching, learning and research for on-campus students and at the same time provide computer services, using Basic, to high schools and other colleges in their surrounding areas.

Small Banks Use Bankcom 'Margin Monitor' Off-Line

CHICAGO – The Margin Monitor service, providing prices, reports and analysis of collateral holdings, is available from Bank Computer Network (Bankcom) as an on-line operation for large banks and as an off-line service.

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Bank Computer Network Inc. is at 333 North Michigan.

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Could Operate by March

FCC Said to Give Go-Ahead to Modified MCI Net

By Don Leavitt
CW Staff Writer

WASHINGTON, D.C. – The Federal Communications Commission has apparently lifted the last obstacle still preventing Microwave Communications Inc. (MCI) from operating its data communications link between Chicago and St. Louis. According to an MCI spokesman, service could begin by February or March.

The commission met in a closed session on Dec. 7, according to an FCC spokesman, to consider proposed modifications to MCI's application. Industry sources indicate that the commissioners approved the changes, although no decision has been formally announced.

Prior to the Dec. 7 meeting, the commission had apparently told a staff opinion and review board to draft a recommendation concerning modifications.

Communications

Earlier the Common Carrier Bureau had recommended commission approval.

MCI said that it already has contracts or letters of intent from users for most of the 300 to 400 channels approved by the FCC in August, 1969. The modifications covered new tower locations, equipment, and antenna configurations.

Some microwave towers are already in place, and only those directly affected by the proposed changes now remain to be built, MCI said.

Meanwhile, the U.S. Court of Appeals for the District of Columbia is holding petitions for reversal of the MCI decision.

The pending court action is between the FCC and the common carriers. It will affect MCI only if an injunction is sought to halt construction until the petition is acted upon, by the court, according to an MCI source.

Earlier, the common carriers contended before the FCC that the proposed modifications are so extensive as to represent a new operation, rather than the one originally approved by the commission.

Since obtaining FCC authorization, MCI has been unable to provide microwave services pending resolution of the various regulatory proceedings initiated by the existing common carriers.

Although it is now classified as a specialized common carrier, AT&T, Western Union, and others have repeatedly challenged MCI's proposed network on the grounds that there is no need for the new type of service.

Sicom to Be Unregulated Under Western Union Plan

WASHINGTON, D.C. – Western Union Telegraph Co. has notified the Federal Communications Commission that it proposes to remove its Securities Industry Communications (Sicom) service from regulated status. Under the plan, Sicom would be transformed into a completely separate subsidiary of Western Union Corp.

In considering the plan, the FCC is expected to apply its tentative decision, that data processing services should be provided only by separate subsidiaries rather than the common carriers. Another factor would be whether the FCC considers Sicom primarily a communications or a data processing service. If the commission considered it to be the former, then by its own definition, Sicom could not be deregulated.

Sicom has been largely devoted to message switching and store-and-forward operations between brokerage houses, their branches, and stock exchange floors. The company has said, however that in 1971 the service will expand its data processing to include order-matching.

The shift of Sicom to non-regulated status, if approved by the FCC, will probably not include a cut in fees under those of competitive services, unless Western Union gives its subsidiary special rate consideration.

Although preferential treatment is a real possibility ('mothers just don't disown their children was the way one observer put it), it will probably be one of the factors the FCC considers in studying the Western Union proposal.

In a formal complaint filed with the FCC last summer, Bunker Ramo charged that users of its Telequote services, carried on WU lines, were suffering as a result of preferential treatment being given to Sicom users.

Although no hearing date has yet been set, Bunker Ramo spokesman said that the complaint still stands and that it will be pursued 'vigorously.'

Western Union said that it wants to make the Sicom shift in order to have more flexibility in providing services, and to meet non-regulated competition on an equal footing. The detariffing of Sicom would be in the public interest, according to Western Union, because the service could then more quickly respond to "the changing and more demanding requirements" of the securities industry.

A competing securities industry service spokesman told CW that his firm probably would not oppose the change in Sicom.

With few previous instances of carriers proposing to de-regulate a service, the commission is expected to issue a call for opinions from interested parties, according to one observer.

Datran Building Bid Slammed by Carriers

WASHINGTON, D.C. – Datran's request to the Federal Communications Commission that it begin construction of its microwave network has brought strong reaction from AT&T and other carriers.

Bell argued that if the FCC granted such interim authority, it would in fact be pre-judging several of the basic issues that are "at the heart" of the special carrier proceedings still pending before the commission.

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Hard fact six. Closing for our Software Supplement is Jan. 8, 1971.

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- Reporting on systems measurement tools, including hardware monitors, process time accounting and program evaluators.
- Evaluating what type of installation can benefit most from this range of tools.

For more details about our Jan. 27 Software Supplement, contact the Computerworld representative nearest you.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

SYSTEMS **COMPUTERWORLD** PERIPHERALS

December 23, 1970

Bits & Pieces

Bioserv Terminal Allows Medical Data Transmission

ROCKVILLE, Md. – A biomedical terminal that provides increased accuracy, according to the company, and makes long-distance transmission of data from biomedical and clinical laboratory instruments more economical has been developed by Communications Services Corp.

Called the Bioserv BD/TR-1 the unit features analog-to-digital conversion, digital storage on Phillips-type tape cassettes, and digital transmission to a remote site for processing and analysis.

Purchase price of the terminal is $4,800. Lease prices can be negotiated, the company said. Deliveries are scheduled for March, 1971, from 1055 First St.

SI Controller Connects Disks To Several Minicomputer makes

SUNNYVALE, Calif. – Systems Industries is offering two minicomputer disk storage systems, a 1.66-million word removable cartridge system called the 3500, and the 3400, a 32K to 524K word head-per-track unit.

Systems Industries makes the controllers to suit a variety of minis, including the PDP-8, Nova, Varian 620, and Microsystems 810.

According to the company, the two different disk drives may be combined on one controller, to a total of four.

The price of the 3500 Removable Cartridge Disk System is $10,900 for the controller and one drive. Additional drive are priced at $5,200. The prices of the fixed-head disk, the 3400 Rapid Access Head-per-Track Disk System, range from $8,000 to $11,000. First deliveries are slated for March 1971, from 535 Del Rey Ave

Keyboard-Equipped CRT Display Used to Replace Teletypewriters

NORTHRIDGE, Calif. – A low-cost keyboard-equipped CRT display from Unicomp, Inc. is designed to replace teletypewriters.

The Model 522 features a split screen with two light intensity levels with a capacity of 1,998 (80 by 24) characters.

The Unicomp 522 is priced at $4,500 on a 60-day delivery schedule, from 18219 Parthenia St.

Printing Terminals, Tape Deck Introduced by Computer Devices

WOBURN, Mass. – Computer Devices has introduced two Teletype-compatible portable printing terminals with acoustic couplers intended for use in time-sharing, and an incremental tape deck.

The CDI 1010B is said to be the smallest and lightest portable printing terminal capable of multiple copies, and is priced at $2,100.

The CDI 1030 thermal printer prints 96-character Ascii code at 80 char/line, at a price of $3,500.

The CDI 3600 records data incrementally on a bit-serial, character-by-character basis at 30 char/sec. It is priced at $900 on a 30-day delivery schedule from 10 Sonar Dr.

Computek Announces Price Cuts On Terminal, Selector Tablets

CAMBRIDGE, Mass. – Computek, Inc. has reduced the price of its Series 400 Model 20 Graphics Termianl from $12,400 to $11,200.

Also announced were reductions in the prices of the Models GT50/8F and GT50/8S Graphic Selector Tablets. The former was reduced to $1,600 from $2,700, and the latter was cut from $3,100 to $1,800.

Computek is at 143 Albany St.

Unit Digitizes Graphics for Fax Line

By Frank Piasta
CW Staff Writer

WESTBORO, Mass. – A device that can accept graphic data for transmission via facsimile directly to a computer has been developed by Alden Electronic & Impulse Recording Equipment Co.

The Model 9285 Digital Facsimile Scanner was originally developed for the National Meteorological Center where it is used in the updating of weather maps, by an IBM 360.

The device is intended to eliminate manual X-Y point location and identification. It can scan 96 points per inch both horizontally and vertically (9,216 points/sq in.). Ten shades of grey can be identified and recorded.

According to Alden, an 18 by 14 in. weather map can be scanned and digitized in one minute.

Applications on which the scanner could be used, in addition to the updating of weather maps, include the grading of garment patterns in the dress industry, and the modification of engineering drawings, Alden said.

An eight-bit word is used for X and Y coordinates with an additional three bits used to indicate shades of grey.

A document can be processed immediately, or transferred to a storage device, such as a disk file. Copies can be retrieved with a facsimile recorder.

The 9285 Digital Facsmilie Scanner is priced from $8,000 on a 90-day delivery schedule, from the Alden Research Center.

Communications Control System, TTY-Compatible CRT Introduced

INGLEWOOD, Calif. – A communications control system developed by Computer Communications, Inc. is designed to enable several remotely located low-speed terminals to communicate with a central computer over a single high-speed line.

A portable CRT terminal from the same conpany is designed to replace Teletype units in communications networks without hardware of software modifications.

The CC-71 Communications Concentrator control system permits remote terminals to transmit data serially as though they were sending data to the CPU directly. As characters are received they are buffered into blocks of core memory until an end-of-message segment is indicated. The message is then queued from transmission to the CPU.

The number of terminals handled by the CC-71 is restricted by the speed of the communications line to the computer. The communications between the terminals and the CC-71 is generally at rates of 110, 150, or 300 bit/sec. The transmission line to the computer can operate at 1,800 to 9,600 bit/sec.

Prices for the CC-71 depend upon the amount of core memory required and number of lines. A typical system which would handle 24 lines and have 16K bytes of core is priced at $39,800. Deliveries begin the first quarter of 1971.

The CC-335 Totelcom terminal permits the entry and editing of displayed data for on-line use and provides storage for I/O transmission of data.

Totelcom uses the Ascii character and code set and displays the 64-character upper case subset in a format of 12 lines of either 72 or 80 characters. The keyboard is designed to be TTY-compatible.

When the CPU transmits a message, a segment is transmitted to the CC-71 which forwards it to the terminal.

The maximum size of a message segment can be specified for each communications line. The size is limited only by the available core buffer area in the CC-71. The device places no restriction upon message length and infinite length messages from real-time sources can be handled.

Faster Memories at Lower Cost Can Result From Interleaving

By Frank Piasta
CW Staff Writer

Interleaving is used as a means of increasing the effective speed of a computer memory without a substantial increase in cost.

One of the problems in building a high-performance computer is that the cost of memory goes up proportionately faster than the increase in speed. This is due to increased sophistication required in the circuitry.

If, however, the memory is designed to allow the accessing of two or more pieces of data almost simultaneously, the effective speed of the storage would be almost doubled without any change in memory circuitry.

Under conventional designs, the processing unit can access only one item in storage at one time. By subdividing the memory into several sections, each with its own port to the processor, the processor does not have to wait until the accessing cycle in one memory bank is complete before requesting data from another bank.

This partitioning of memory into several smaller units, each separately addressable, is called interleaving.

The concept of interleaved memory is not new; it was used in second generation equipment like the IBM 7094 and the CDC 1604.

In both of these systems instructions were stored in one bank of memory while the data was stored in the other. This allowed the fetching of the next instruction from one bank while the previous command was obtaining data from the other bank. The is known as two-way interleaving.

In recent years, processor speeds have greatly outstripped those of memory. Several systems currently offered are able to execute an instruction in the length of time required for one memory access, or less. Interleaving has also been applied in relatively sophisticated configurations to try to keep the processing unit busy.

The availability of multiple processors attached to one memory system has the advantage of making the same data base available to all processors. Inherent in this design is an aggravation of the accessing problem. In these configurations, if the processors have to wait for each other to access memory, simultaneous operation is impossible.

Interleaved memory, with separate access ports to each bank, can resolve this problem in most cases. The exception is in those instances where more than one processor has to address the same data item at the same time. Conflicts of this nature are usually resolved by assigning priorities to the processors.

The most common use of interleaving has been in powerful systems. The large systems from Burroughs, Univac, Control Data and IBM are among these.

In most cases, these systems use addresses that are allocated consecutively to sequential memory banks. For example, address one would be in bank one, address two to bank two, address three to bank three, etc. In the case of four-bank memory, address five would then be found in the first bank.

Ideally, the user of a system that incorporates interleaving need not be aware that it is there. The only thing that he would notice is a significantly higher performance than the memory cycle time of his system might lead him to expect.

Judicious planning can take advantage of the separate ports with a resulting higher job throughput. The exact procedure the user would follow depends on the particular configuration of the system, but such things as number of modules and the number of bits accessed per cycle have to be considered.

In the last analysis, interleaving has made it possible for users to gain significant increases in computer performance

DEC Introduces Four PDP-15 Printers, Light Pen and Software for Graphic-15

MAYNARD, Mass. – Four LP-series line printers for the DEC PDP-15 offer speeds ranging from 173 to 356 line/min.

Also for the PDP-15, four software routines and a low-cost light pen for the Graphic-15 display system are intended to increase the drawing capabilities of the system.

The LP15F and LP15J are both equipped with a 64-character set. The first has a print line of 80 characters and can print 356 line/min. The second has a 132 character line and a speed of 245 line/min.

The prices of the units range from $14,000 to $21,000.

The new software routines are used to enhance the capabilities of the Fortran-IV-based package that accompanies the Graphic-15 system.

The light pen is a photo transistor device that is said to be insensitive to ambient light.

The price of the light pen is $700. The software is free with the purchase of the system.

Tape Handling Accessories Described in TTY Booklet

SKOKIE, Ill. – A 16-page booklet, Paper and Tape Handling Accessories Catalog, available from Teletype Corp., describes ways to organize and simplify handling of paper and paper tape of TTY data communications terminals.

Shown are typical handling methods for Teletype 37, 35, 28, 32 and 33 data terminals, as well as for high-speed Telespeed terminals.

Detailed data on winders and unwinders, plus ordering information for spare reels, adapters and tape splicers are also provided.

The booklet is available from 5555 Touhy Ave.

MSI Terminal Uses Batteries

MONTCLAIR, Calif. – The Source 2002 battery-operated, data entry terminal from MSI Data Corp. is said to be the lightest alphanumeric terminal available. The firm also has an off-line data receiver for fast, economical delivery of data from the point of entry to a central computer.

The terminal weighs less than eight pounds and includes a recorder and removable magnetic tape cassette, rechargeable nickel-cadmium batteries, controls, alphanumeric keyboard, and electronic components.

Data is entered on the keyboard, recorded on a cassette and transmitted at 40 or 60 char/sec over telephone lines.

Optional features include a strip printer, two-way communications, polling, and a separate keyboard with standard numeric 10-key layout plus eight special characters.

The basic unit sells for $1,135, plus $550 for a printer option. A communications coupler can be added for $240, and a half-duplex coupler for $410. First deliveries are scheduled for March, 1971.

Data Receiver

The MSI 2900 Data Receiver translates and records data onto 7- or 9-track magnetic tape in BCD, Ebcdic or Ascii, at 556 or 800 bit/in.

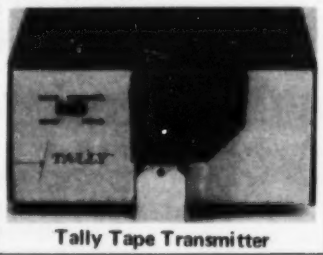
Other features include: automatic dialing and two-way communications as options, tape output read-after-write data checking, attended or unattended operation, and built-in test circuitry. The 2900 receiver is modular and priced between $12,000 and $14,500. It is available for 60-day delivery from 4751 Holt Ave.

Paper-Tape Transmitter Includes Built-In Modem

KENT, Wash. – A $40/mo paper tape transmitter, with a built-in modem, from Tally Corp. can transmit data at 60 char/sec over dial-up lines to a Bell 402D or equivalent dataset.

Tape, paper or Mylar-laminate, is fed synchronously through the read head, and a timing bit is transmitted to optimize the sampling of incoming data.

The unit is priced at $925, on a 30- to 60-day delivery from 8301 S. 180th St.



Tally Tape Transmitter

Standby Power Sources Keep Centers Running

MINNEAPOLIS – Standby sources of electrical power for power failures and brownouts are available from the Onan Corp.

Price ranges from $1,000 to $80,000, from 1400 73rd Ave.

Vista-Com

Tape Holder

Binder Rack

Realist Vista-Com Fiche Reader Can Handle Two Aperture Cards

MENOMONEE FALLS, Wis. – A low-cost microfiche reader, the Realist Vista-Com 42x, features a universal carrier which can handle all COM fiche formats up to six by eight in., including two aperture cards simultaneously.

The reader has a 15 by 13 in. screen with 42x resolution, and sells for $264 from N93 W162888 Megal Drive.

Carrousel Holds 120 MT/ST Or Microfilm Cartridges

REDONDO BEACH, Calif. – The Model 3950 rack in carrousel form, from Rose-Wood of California, can hold 120 MT/ST or 16 mm microfilm cartridges.

The rack stores cartridges in individual compartments, and is composed of three individual forty-cartridge units.

The firm's address is Box 347.

Printout Rack Can Contain 3 Rows of Hanging Binders

HOLYOKE, Mass. – The Control-Rack 911 is a heavy-duty steel rack designed to hold hanging binders of computer printouts.

Made by National Blank Book Co., the rack has three-row storage capacity and can be accessed from both sides.

Fitted with adjustable leveling glides, the rack comes equipped with 30 binder hangers.

Alcohol-Impregnated Pads Clean Disk and Tape Heads

HILLSDALE, N.J. – Texpads, three by four in. pre-saturated pads containing 91% isopropyl alcohol, from the Texwipe Co., are meant for cleaning magnetic disks and tape heads.

Each pad is sealed in an airtight packet to prevent contamination and maintain the solution at full strength. A plastic disk cleaning wand is included.

Table Design Keyed To Computer Equipment

JOHNSON CITY, N.Y. – Tables designed to match computer consoles and peripherals are available from Mer-Lit Fabricating Corp.

Enclosure for IBM Devices Cuts Noise of Keypunching

GARDENA, Calif. – The Model 159T, sound reducing enclosure for IBM Model 024, 026 and 029 keypunches from Computer Accessories Co., features 1-3/4 in. thick walls.

It is available from stock at a price of $245 from 131 W. 154th St.

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ABA Has Literature Reference Guide

NEW YORK – A two-volume reference guide to current literature on bank information systems is available from The American Bankers Association.

Entitled "A Guide to Information Systems Literature," the two softbound volumes are offered as a set for $7.50. The set covers financial information systems, customer information files, and management information systems.

The guide provides a convenient and comprehensive review of the literature on bank information systems in annotated form. Its contents cover a large number of periodicals, journals and presentations published during the period from June 1966 to June 1970.

IEEE, 3i Co. Agree on Retrieval Services

NEW YORK – The Institute of Electrical and Electronics Engineers (IEEE) has reached an agreement with Information Interscience, Inc. (3i) of Philadelphia whereby 3i will market searching services using the IEEE Reflecs data base.

3i Co., which already provides such services in the chemical, drug, and medical fields, will be able to extend its information services into the areas of electrical and electronics engineering, computer science, and applied physics.

IEEE Reflecs (Retrieval From the Literature in Electronics and Computer Sciences) is a monthly magnetic tape service which supplies users with computer-readable bibliographic data, index terms, and abstracts of the important technical literature in IEEE fields of interest.

This worldwide data base can then be used in computerized information systems to supply researchers, engineers, and managers with information pertinent to their work.

Share No Longer Shares Office Facilities

NEW YORK – Dr. E. David Callender, president of Share Inc., has announced the opening of new office facilities at 25 Broadway.

Share Inc. had been using the facilities of the Association for Computing Machinery at 1133 Avenue of the Americas, while developing and formalizing headquarters procedures.

Auerbach Awards Third Israel Fellowship

PHILADELPHIA – The Auerbach Fellowship in Information Sciences for 1971 has been awarded to Ezra Harel of Israel.

The fellowship was created by Auerbach in 1967 in cooperation with the Information Processing Association of Israel. The program provides the opportunity for an Israeli, experienced in computer systems analysis, to spend one year of in-service training in the U.S. as a member of the technical staff of Auerbach.

European Management Symposium Set

GENEVA, Switz. – The Center for Education in International Management (CEI), associated with the University of Geneva, will sponsor the First European Management Symposium in Davos, Switz., Jan 24-Feb. 7, 1971.

Billed as a totally new experience in management development, the symposium has invited 750 senior executives of Europe's major companies and, in particular, the general management of progressive medium-size companies.

George P. Baker, dean of Harvard Business School, 1962-1969, will be symposium chairman.

The faculty will include J.K. Galbraith, Herman Kahn, Jean Rey, Barbara Ward and other professors from Harvard, MIT, Wharton and CEI.

The focus will be on the development of business strategy and action plans; the shaping of the organization for optimal performance; the use of computers in business; and the development of human resources.

The first week, "The Challenge of the Future," will concentrate on factors whose impact will change the world of business.

The second week will examine "Corporate Strategy and Structure," analyzing strategy formulation, MIS, and organizational alternatives to meet the challenges of the current and future decades.

Applications should be sent to Dr. Klaus Schwab, Secretary General, First European Management Symposium, Centre d'Etudes Industrielles, 4 Chemin de Conches, 1211 Conches-Geneve, Switz.

Calendar

Jan. 12-14, Honolulu – Fourth Hawaii International Conference on System Sciences. Contact: HICSS-4, University of Hawaii, Department of Electrical Engineering, Honolulu, Hawaii 96822.

Jan. 19-21, Oaxtepec, Mor., Mexico – Mexico International IEEE Conference on Systems, Networks & Computers. Contact: M.A. Murray-Lasso, Instituto de Ingenieria Ciudad Universitaria, Mexico 20, DF Mexico.

Feb. 9-11, New York – Compso East, regional computer software and peripherals show and conference. Contact: Computer Exposition, Inc., 254 West 31st St., N.Y., N.Y. 10001.

Feb. 10-12, New Orleans – Mid-winter meeting of the National Microfilm Association. Contact: National Microfilm Association, 8728 Colesville Road, Silver Springs, Md. 20910.

LSU Conference On Computer Control Scheduled

BATON ROUGE, La. – The Sixth Annual Conference on the use of digital computers in process control will be held Feb. 17-19 at the Louisiana State University and will include 12 technical papers and two panel discussions.

The panel discussion on "Sizing the Computer for an Industrial Control System" will be moderated by Dr. Paul W. Murrill, Louisiana State University.

The panel "Sizing the Computer to the Task," will be moderated by Dr. Charles Moore of the University of Tennessee.

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University Aids Election

ANN ARBOR, Mich. – When the final returns from Michigan's 1970 general election were in, the role played by the University of Michigan Computing Center's computer and the associated Michigan Terminal (MTS) could be voted a definite success.

In a joint effort, AP and UPI wire services purchased time on the university's 360/70 computer to aid in the tabulation of returns for non-local issues in the state of Michigan.

The use of the computer produced a much faster tabulation of state and district totals, which were reported on a county by county basis, than would have been otherwise possible.

DP Schools Still Operate Pending Ruling in Suit

LOUISVILLE, Ky. – An operator of business and technical schools has begun independent operation of computer programming schools in eight cities, while it awaits the outcome of an antitrust action filed against the firm that franchises the schools.

Contemporary Institute Inc. seeks to invalidate the franchise agreements made with Electronic Computer Programming Institute (Ecpi) of New York and recover triple damages for all fees, royalties and other charges paid to the institute last year.

...From Shakespeare To Record Processing

BUFFALO, N.Y. – At a given moment, 40 different people on the State University's several campuses here may be doing 40 different jobs with the help of one computer.

The jobs may range from writing a thesis on Shakespeare to processing the records of an incoming student.

At strategic locations on campus, the university has installed 40 terminals, linked by telephone lines to an IBM 360/40.

Through the terminals, students, faculty members and administrators can use the computer to store, edit and revise almost any kind of manuscript, report or other item of paperwork.

A T/S System for Everyone

UNIVERSITY, Ala. – The University of Alabama has unveiled a new computer utilization system aimed at putting large-scale processing power within easy reach of students, faculty members and research teams campus-wide.

"Adoption of this new technique is part of an overall program to give our students the maximum amount of experience with and exposure to computing techniques," said university president, Dr. David Mathews.

Eleven communications terminals have been located around the campus, linked by telecommunications lines with the central IBM 360/50 in the Mathematics and Psychology Building.

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December 23, 1970

CI Notes

Advanced Shows Tape Unit

MOHAWK, N.Y. – Advanced Digital Systems Inc. demonstrated a working prototype of an automatic tape library control system at a private stockholders meeting earlier this month.

Peter Polus, general manager, said full scale marketing efforts will begin in February. The system, which is believed to be the first of its kind, offers computer controlled transfer of individual tapes between library and tape drive, full administrative and record keeping functions, and automatic retention and updating of master, backup, and scratch tapes.

Ansi to Consider Cassettes

WASHINGTON, D.C. – The Ansi X3B1 committee on computer tape will initiate work on standards for recording digital information on magnetic tape cassettes.

Those interested in participating should contact: A.J. Burkhart Jr., GSA Magnetic Tape Laboratory, Rm. A109, Technology Building, National Bureau of Standards.

The development is to include considerations of the cassette container, the tape, recording characteristics and recording format. Initial work will concentrate on performance characteristics such as length of tape and tape speed.

Supershorts

CULVER CITY, Calif. – Ampex Corp. has begun delivering lithium ferrite cores to Cambridge Memories, Inc. (CMI), Newtonville, Mass., under a $280,000 contract.

– – –

LOS ANGELES – Digital Equipment Corp. has signed a purchase agreement for purchase by DEC of Data Products Corp.'s 2000 series line printers. The agreement, valued at several million dollars, includes orders for Data Products 2310 and 2410 model line printers for use with DEC PDP-8, 11, 12, and 15. Deliveries of the 2310s and 2410s are scheduled until late 1972.

– – –

PARIS – Metra International, environmental planning and computer services group, has created an international computer services network, SIA International, to coordinate the activities of SIA, France and SIA, UK. The SIA International computer services network currently has three Control Data computers in France and a Control Data 6600 in the UK.

– – –

BOUND BROOK, N.J. – Decision Making Systems department of American Cyanamid Co. has entered into a contract with Trans World Airlines in New York for the development of an automatic baggage tag reading system.

– – –

Roy P. Trowbridge, director of engineering standards, General Motors engineering staff, has been elected president of the American National Standards Institute by the Board of Directors.

Independents Seen Hurt

IBM Pulls Off Disk Marketing 'Coup'

By Peter L. Briggs
Special to Computerworld

WHITE PLAINS, N.Y. – By slight adjustments in configuration to take advantage of lower price for the 2319 version of the 2314A spindle, IBM has pulled off one of the most interesting coups in the history of the computer industry (see story Page 1).

IBM has moved to re-establish its position in the independent disk drive area, and gave its customers a nice Christmas present.

Immediately after the announcement, even before the official announcement in some cases, Wall Street reacted by dropping the prices on Memorex and Telex. Telex was suspended from trading twice during the day of announcement.

The brokers apparently determined that the independents would have to sacrifice profits and revenues to maintain a price advantage over IBM. That, in a time of tight money and slimmer profits, could hardly be viewed as encouraging from the Street. Earnings should certainly be hurt, no matter what else happens.

IBM, by making the 2319 available for the System/360, allowed users to get some 2314-equivalent system for about 8% less than the lowest-priced independent could offer, and eliminated all charges for overtime usage on disk drives in the bargain.

Both these factors have been critical in the marketing success of the independent disk drive manufacturers, and have made the current 30% annual growth rate in independent shipments possible.

Unless the independents announce major price cuts, expected soon, it seems likely that many independent users will find it too expensive to remain with the independent vendor.

They will probably return to IBM, and be happy with their monthly rental savings. There is also a psychological angle involved. Users seem to want to deal with only one vendor when possible, making IBM's new position even more attractive.

Richard Caveney of the Computer Peripherals Manufacturers Association said that this action by IBM definitely means the end to the "price umbrella" in the peripherals industry.

He said that it indicates that IBM has adopted the hard sell posture and that others in the business will "have to play their game."

The action by IBM "without any doubt substantiates that competition is good for the end user and has to be maintained or the user will have to pay higher prices," he said.

Other industry sources indicate that the CPMA will file with the Justice Department asking that agency to consider the peripherals question as a large part of its antitrust suit against IBM.

In addition, it appears that the organization will ask the comptroller general to void the recent IBM Federal Supply Schedule contract with IBM on the grounds that it causes unfair competition.

Dollar Effect on IBM

What could this mean to IBM in dollars? There are about 8,000 2314s installed at present. Some small percentage of these units will have the minimum of three spindles. This group could switch to the 2319, costing IBM $455/mo for each one. The group with the full 2314 (9 spindles) will shift to the controller plus three 2319s (9 spindles) at a cost to IBM of $1,025 in revenue per month for each one.

Another group, those using four 2311 drives on a 360/30 or 40, might switch to the 2319, costing IBM $325/mo each in revenues.

There could also be new revenue from those users who have rented independent 2314s, and who may now go back to IBM.

Peripheral Makers Lose Out— CDC Lands IRS Order for CRTs

By Alan Drattell
CW Washington Bureau

WASHINGTON, D.C. – A mainframe maker, Control Data Corp., has walked off with a Federal Government contract which includes one of the largest peripheral packages ever awarded – a $29.3 million plum from the General Services Administration (GSA).

Under the contract, over the next 18 months CDC will provide and install 10 CDC 3304 computers and 3,600 CDC 65054 CRT display terminals at Internal Revenue Service facilities throughout the country.

In this landmark contract, the mainframe makers had been asked to submit separate proposals for the computer and display portions of the award, and independent display manufacturers were invited to bid on the CRT segment.

Among the peripheral makers believed to have bid are Bunker-Ramo, Foto-Mem, Infoton, Raytheon, Sanders Associates and Sylvania's Ultronics Division.

Originally, GSA had estimated the total package would approximate $40 million – with some $20 million geared for the CRTs.

CDC's bid on the CRTs is believed to have totaled about $11.9 million, making each CRT about $3,300, a price that one industry source claimed would be the cost of an excellent color television receiver. "How can anybody compete against that kind of pricing?" he asked.

John McPhail, marketing manager for Infoton, said the company was "naturally disappointed in the result. The GSA, though, did an outstanding job in writing the RFP, in exhaustively examining the offerings of companies and in weighing the bids.

"The government very much wanted to split the offering to prove that you can hang foreign terminals on someone else's computer. But what could they do? The guy with the best price always wins."

McPhail added that Infoton has asked GSA for a debriefing. "Every young company," he added, "would have liked to get this award." Infoton, he disclosed, has received a bigger CRT order than the IRS contract from a commercial account that it will announce shortly.

However, there is an uneasy feeling in Washington that the peripheral makers will not completely ignore the loss of what was considered a contract "plum."

The Joint Economic Committee (JEC) of Congress, for one, could conceivably become involved. A committee spokesman would only indicate, however, that the JEC "is aware of the award."

ISS Employee Named In IBM Secrets Suit; Further Action Open

SANTA CLARA, Calif. – IBM has filed its second trade secrets suit in the past few weeks [CW, Dec. 9].

The new action seeks to enjoin Dr. Richard Stock from disclosure of IBM trade secrets and confidential information and the return of engineering drawings and specifications allegedly in Stock's position.

Further Action Possible

Stock, formerly an employee at IBM's San Jose, Calif., facility, is presently employed by Information Storage Systems, Inc. (ISS), which is named in the suit, but not as a defendant. A "First Doe Corp." is named in the suit, leaving open the option for further legal action.

ISS presently manufactures IBM-compatible disk drives, primarily for Telex and Hewlett-Packard, with several smaller clients. Neither the firm nor Stock would comment on the charges.

At IBM Stock was in engineering research and development concerned with disk files, IBM said. ISS lists him as a coating chemist at its plant.

IBM would not say what equipment was involved in the suit, but its new 3330 disk system was developed at the San Jose facility.

ISS said that it would not now make any announcement in the area of 3330 compatible units, but noted: "We are in the compatible disk drive business."

Other recent IBM suits involve Memorex and its subsidiary, Peripheral Systems Corp.

New Management Named at Viatron

BEDFORD, Mass. – "Out with the old and in with the new" was the word at Viatron last week.

The third president in six months will be Robert Dockser, formerly senior vice-president, replacing Roger R. Phillips, who resigned to accept a position with another company.

Thomas Murray, vice-president, and Ernest Friedlander, treasurer of Exeter International Corp., have been elected as directors, replacing Dr. James J. Cannon, Dr. Pierson Hunt, and Charles Morrill, who have resigned.

Exeter has loaned Viatron $430,000 and hired a management consulting outfit to study the operation of the troubled firm. Besides Friedlander, another Exeter man, Maynard Goldman, has taken over as president of Viatron's international operations.

Viatron announced that it has developed a plan to exchange shares of common stock for outstanding debentures. Presently the firm is unable to meet debenture interest payments due on Nov. 30 – and the 30-day grace period is fast running out.

RCA Data Link System for AF Part of Experimental SAC Plan

BURLINGTON, Mass. – A communications system to link ground-based and airborne computers that control the nation's nuclear retaliatory forces will be developed for the U.S. Air Force by RCA.

The system will permit new data entered into computers at Air Force Strategic Air Command headquarters to be relayed directly and automatically to an RCA-developed experimental computer system that flies aboard one of SAC's Looking Glass aircraft. Looking Glass aircraft are kept aloft around-the-clock to assume control of the nation's strategic missiles and bombers should ground control centers be destroyed.

RCA developed and installed the experimental computer system, known as the Post Attack Command Control System – Airborne Data Automation (PACCS-ADA), aboard one of the Looking Glass aircraft last year. It is designed to assess the feasibility of providing computerized information management capabilities for airborne commanders.

Under the new $575,000 contract, RCA will develop an operationally secure data link between the aircraft and the ground, and will install and integrate the system aboard the PACCS-ADA aircraft, according to John R. McAllister, division vice-president and general manager of RCA's Aerospace Systems Division.

The data link will permit extensive tests and evaluation of air-ground communication between the computers under operational conditions, he said.

The PACCS-ADA aircraft for which the data link is being developed is the test bed for a larger, fully automated fleet of Advanced Airborne Command Posts. Data compiled and evaluated from flight tests of the PACCS-ADA aircraft will be used as a guide for system performance and specifications.

The PACCS-ADA system was developed by RCA Aerospace Systems under a $5.5 million contract from the Air Force Systems Command, Electronic Systems Division, Hanscom Field, Mass.

Honeywell Combines Peripheral Operations At Three Locations

MINNEAPOLIS – Honeywell Inc. has consolidated the peripheral devices operations of its information systems business and named Bruce Dobberteen vice-president in charge of operations in Oklahoma City, and Billerica, and Lawrence, Mass.

The close similarity of work in the Oklahoma City, Billerica and Lawrence operations makes this move a natural consolidation of efforts, according to Honeywell.

The company also announced that Anthony D'Amelio will become director of operations at Billerica and Lawrence, reporting directly to Dobberteen. Dobberteen succeeds Frank E. Lenherr, who has been on a leave of absence from GE.

The consolidated operations develop and manufacture mass storage and peripheral products, including disk drives, magnetic tape drives, card readers, card punches, paper tape readers, line printers and CRT terminals.

Contracts

The Electronic Systems Division of The Bunker-Ramo Corp., Westlake Village, Calif., has been awarded a contract by the U.S. Air Force Avionics Laboratory to develop a small general-purpose computer for aerospace applications.

Wyle Computer Products, Inc., El Segundo, Calif., has received a contract, valued at more than $2 million, from Computer Sciences Corp. for data terminals for the New York City Off-Track Betting System.

Management Systems Corp., subsidiary of American Biomedical Corp. of Dallas, has contracted to provide all data services, at a cost of over $1 million, for the Oak Cliff Savings & Loan Association.

Tracor Data Systems, Austin, Texas, has awarded a $4.8 million contract to Tempo Computers Inc., Fullerton, Calif., for 100 Tempo I computer systems.

Peripheral Dynamics, Inc., Norristown, Pa., has received a $66,000 contract from Systems Engineering Laboratories, Inc., Fort Lauderdale, Fla., for C301 automatic card readers.

The Federal Aviation Administration has awarded a $1.5 million contract to the Raytheon Co., Sudbury, Mass., for the establishment and operation of a testbed facility for display systems for the nation's automated air traffic control network.

The Department of Transportation has awarded a $71,200 contract to the Metropolitan Council of Twin Cities Area in Minneapolis-St. Paul for the demonstration of a program to improve urban transportation planning.

Di/An Controls, Inc., Boston, has received a $2.6 million contract from Computer Sciences Corp. to provide 1,000 ticketing terminals as part of the New York City Off-Track Betting System.

The Buffalo Police Department has signed a contract with Computer Task Group, Inc., Williamsville, N.Y., to develop an automated data storage and retrieval system.

Control Data Corp.'s Professional Services Division has been awarded a contract by the National Cooperative Highway Research Program to study the use of interactive computer-graphics in the design of U.S. highways.

Computer Sciences Corp. of Los Angeles has received a $5 million two-year contract from Nasa to provide programming and computer support services for the manned space flight network central computing system at Goddard Space Flight Center, Greenbelt, Md. In addition, CSC has received a $6.5 million contract from the U.S. Navy Purchasing Office for the development of an acoustic intelligence data system for the Naval Scientific and Intelligence Center at Suitland, Md.

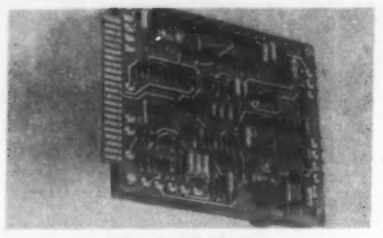
Analysts International Corp. of Minneapolis has received a $90,000 contract from The St. Paul Companies to develop a data processing software system for payroll, personnel, and statistical applications.

Planning Research Corp. of Los Angeles has been awarded a $135,000 contract to develop a master plan for a statewide automated management information system in Michigan, under the direction of the Management Sciences Group in the state's executive offiice.

Credit Systems, Inc., Colmar, Pa., has received a contract from Woolco Department Stores to install and maintain a credit authorization system, using CSI-Model 360 point-of-sale terminals.

Incoterm, Marlboro, Mass., has received a contract from British Overseas Airways Corp. for display terminals to be introduced into Boac's reservations system.

Standard's Mini-Mass


RFL 5105 Modem

'Mini-Mass' Core Memory System Designed for Minicomputer Use

SHERMAN OAKS, Calif. – Standard Memories, Inc., a subsidiary of Applied Magnetics Corp., has announced a new 750 nsec core memory system, expandable to a capacity of 1,152K bits, that will sell for only 2.4 cent/bit in its maximum module configuration.

Called the Mini-Mass, the memory is said to be ideal for such applications as memory extension for mainframe minicomputer manufacturers and other bulk storage media.

The Mini-Mass is offered in the basic 16K by 18 or 8K by 36 configurations and is field expandable to its maximum module capacity in increments of 4K.

The Mini-Mass sells for $28,755 per single unit in its full 1,152K bit capacity or at 2.4 cent/bit. Quantity discounts and delivery schedules are available on request.

The firm is at 15130 Ventura Blvd.

New OEM Products

OEM Modem Bell-Compatible

BOONTON, N.J. – RFL Industries, Inc. has introduced an originate only, 103-type modem for OEM applications.

This all solid-state modem, designated Model 5105, is compatible with Bell 103A2, 103E, and 103F models. The 5105 is capable of operating full-duplex at 300 bit/sec, is strappable for half-duplex and will interface to Bell couplers.

Digital interface for EIA, CCITT, TTL, DTL, and Teletype is provided and control functions including signal common, transmitted data, received data, and request to send is standard; data carrier detect is optional.

Prices start at $95.

TI Tape Transport Features Vacuum Column Buffering

HOUSTON – A tape transport with single capstan drive, precision tape guides, tape oxide contact only at the head, and vacuum column buffering is now available from Texas Instruments' Digital Systems Division.

Designed for standard 19-in. rackmounts, the 979 is 24.5 in. high and 12 in. deep. It accommodates standard 10.5-in. reels and has swing out subassemblies and plug-in circuit boards.

Any single speed from 15 in./sec to 45 in./sec is available with 7- or 9-tracks, at 200, 556, 800, or 1,600 bit/in.

The division can be reached through P.O. Box 66027 here.

Terminal Data Introduces Hardware Titling Release

VAN NUYS, Calif. – An Automatic Microfiche Tilting System for the DMF-2 Computer-Output-Microfilm Camera has been introduced by Terminal Data Corporation.

The new system, Hardware Titling, produces two rows of characters across the top one-half inch of a 6-in. by 4-in. or tab-card size microfiche. Up to 42 characters can be printed in each of the two rows with a character height of 14 in.

The standard Hardware Titling system operates under direct program control and accepts Ascii code to produce all of the code's 64 characters. The write time per character is 50 msec. A second version which accepts Ebcdic code directly is currently under development.

Prices are negotiated by the firm at 16130 Stagg Road.

Amphenol Develops Reed Keyboard Switch Family

BROADVIEW, Ill. – A new family of sealed reed keyboard switches has been developed by Amphenol Switch Division of The Bunker-Ramo Corp.

Amphenol's 601 Series reed keyboard switches have been designed to permit individual adjustment to specified operating point before leaving the factory.

Each reed switch is factory checked for continuity and resistance after an aging or "burn-in" period.

Electrical characteristics include the following ratings: 0.200 maximum initial contact resistance, 125 Vdc (resistive) maximum contact voltage, 500 mA dc (resistive) maximum contact current, 10W (resistive) maximum contact power handling capacity, 300 V ac voltage breakdown characteristics at 60 Hz. All contacts are single-pole, normally open (SPNO).

The firm is at 2855 South 25th Ave.

Peripheral Equipment Announces Encoded Data Format

CHATSWORTH, Calif. – Peripheral Equipment Corp. has announced that its 7000-Series of magnetic tape transports has been expanded to include several new 1,600 char/in. phase-encoded models. These synchronous transports are available in read-after-write and write/read configurations.

Purchased in quantities of 100, the 1,600 char/in. read-after-write sells for $3,220, and the 1,600 char/in. write/read for $2,920.

Company headquarters are at 9600 Irondale Ave.

Westinghouse Adds Satellite Processor To Computer Line

ORLANDO, Fla. – The Westinghouse 2550 satellite processor system is the first new product to be added to the Westinghouse 2500 computer line.

The 2550 is a programmable system designed for remote batch processing, remote job entry, and off-line data processing. It incorporates the Westinghouse 2500 computer with a 4,096 word-memory, a communication control console, data set adapter, 300 card/min reader (600 card/min optional) and 350 line/min printer (600 and 1,200 line/min optional).

Software for the basic Westinghouse 2550 consists of the executive communication system, card reader handler, line printer handler, data set adapter handler and communication formatter. Optional software packages are offered free of charge and include Symbal II, Basic compiler, Fortran IV compiler, report program generator, utilities, and unit diagnostics.

The 2550 sells for $36,500 for the first unit, with an "OEM discount" thereafter. Westinghouse said the main market for the 2550 would be OEM.

Nickels & Dimes

As if it weren't hard enough department: Guess who's making ICs – **General Electric**. The light bulb company has come up with a new manufacturing process that turns out curcuits on a spool of film, looking something like 35mm negatives. First two products are an operational amplifier and a switch. Just what the industry wanted – more competition.

$$$

Cleveland's **Leasepac Corp.** has agreed to acquire Datapax Computer Systems of New York. The acquisition would make Leasepac the largest independent lessor of disk packs in the U.S. and Canada. One result of the merger might be a push into the European market. Leasepac will take over Datapac's term loans and issue a package of preferred, convertible stock for Datapac.

$$$

Management at **Data Trends** is predicting a "substantially better performance" in the first half ending Dec. 31 than last year. In the half ending Dec. 31, 1969, DTI made $199,000 or 21 cents a share.

The company is "nearing completion of development work" on a small business-oriented DP system to rent for "considerably less than $1,000" a month.

$$$

One development of the Honeywell-GE merger that no one has considered is the shrinking of the ranks of the Seven Dwarves. Are we now to say "the Six Dwarves?" And how do we explain to those outside the industry which one of Snow White's friends we have killed off? Or do we simply promote DEC to dwarf status?

$$$

And for all the floor traders: A feasibility study commissioned by the Toronto Stock Exchange has concluded that a computer could replace the trading floor.

Traders working in their offices or in a central trading area would buy and sell by entering their orders into a terminal hooked up to a central DP system. The exchange's board of governors is exploring the proposal.

$$$

And **Dearborn Computer and Marine** is out of the hand of the evil foreigners. The leasing-cum-offshore oil company ran afoul of the Shipping Act of 1961 when someone discovered that a group of Bahamian mutual funds owned over 25% of the company's stock. The Act says that since Dearborn is engaged in shipping, the company must be at least 75% domestically owned. But it's all been cleared up. Dearborn has bought 60,000 of its shares from the funds, reducing the Bahamian holdings to about 24%. And everybody's happy.

$$$

According to **Planning Research** President Robert W. Krueger, PRC officials expect a "somewhat better" rate of increase in per-share earnings in the fiscal year ending June 30 than the 13% growth recorded in fiscal 1970.

Krueger said the company will still realize its projected average annual growth rate of more than 20% a year.

Viewpoint on Mini Market

Interesting Battle Looms Between DEC, IBM

By Michael Merritt
CW Staff Writer

MAYNARD, Mass. – There's a donnybrook shaping up in the minicomputer game, and it is beginning to look as if the two main contenders will be IBM and Digital Equipment.

By its announcement of the System/3 Model 6 and the System/7, IBM has declared that it intends to invade the small computer market. While it has had a stake in the game before with the System/3 Model 10 and the 1130, the big company's weakening domestic sales have set it to scrambling for new means to maintain its growth.

The new minicomputer announcements, following on the heels of the tremendous acceptance of the original System/3, indicate that IBM has decided that there are indeed rich waters for fishing in the small computer field.

Even though it takes many System/3s to equal any 370 in either profit or sale size, IBM has been making money on small ticket items for a long time. Salesmen won't object to having another trick in their bag, and a mini user is always a potential upgrade to a small 360/370.

On the other side of the battle line is Digital Equipment Corp., current rooster of the minicomputer coop. On a worldwide basis, over 40% of the dedicated application computers have been made by DEC, and currently deliveries are running at about 350 a month.

DEC has had some problems recently, too. Stung on one side by the "brash" promotion of Data General (the adjective comes from a DEC officer), and

Financial

hurt for the first time recently by the sliding economy, DEC has responded with a dramatic expansion of its product line – CPUs, peripherals, software – and by increasing its service staff from 650 to 800 and its sales force from 300 to 400.

Though market conditions forced DEC to cancel a $25 million stock offering early this year, there is no doubt that the minimaker is still preparing for battle.

While there are still engagements to be fought with other minicomputer manufacturers – DEC Vice-President Nick Mazzarese listed Hewlett-Packard as prime competitor in time-sharing, General Automation and Data General in the OEM field, and Honeywell in communications – Mazzarese said: "IBM is a strong force in the minimarket; they're going to set the tone for a long time in the future."

Minicomputer prices tumbled in 1970. The hardware costs of a system – CPU and peripherals – have been cut in half. Mazzarese said that DEC's profit margins have remained constant, "within 5%," but even so, that means that sales must more than double to maintain even profits.

The DEC vice-president said that to do this his salesmen are shooting at three customer targets: existing DEC customers, people who have never seen a computer before, and current users of IBM equipment.

The line Mazzarese takes is that "IBM has dug its own grave," that it can't offer really cheap EDP without making its multi-billion dollar installed base obsolete.

DEC intends to fight IBM on the lines of straight economy.

How They Stack Up

It should be an interesting fight. IBM's minis are relatively expensive, and IBM has never been known to offer a product without building in a whopping profit margin.

IBM does have a marketing staff that is conceded to be without equal. It can tack an extra few percent on its prices just because the machines have IBM nameplates. And the financial and developmental resources of IBM are, for a game this size, unlimited.

DEC is the daddy of the minicomputer. It has an extensive product line, and new product announcements flow from the company endlessly.

It has the largest installed base of any minimaker, almost as large as all the others put together.

If anyone should be capable of selling system solutions – and the game will probably be to sell a solution rather than a computer – it should be DEC. And it can fight IBM on grounds unfamiliar to the giant – low profit, low cost, high-volume systems.

Much at Stake

Projecting the future structure of computer use, Cmdr. Grace Hopper suggested that the big computer is on the way out. Local minicomputers – albeit communicating vertically to larger information centers – are a much more reasonable and efficient means of structuring information flow, she said.

Almost every blue-sky prediction of computer use 10 years from now includes a very large role for minis. Perhaps this is one reason for IBM's entry into the market.

It will be interesting to see if this market will become another IBM fiefdom, or if Goliath is going to get stoned.

Subsidiary Operating Losses Pull Down Xerox Profits

NEW YORK – Operating losses at Xerox Data Systems have continued to drag down profits of the parent company.

Xerox Corp. President C. Peter McColough said in an interview: "We don't see a rapid turnaround in 1971 for the computer industry and therefore not for XDS. I wouldn't want to predict it will break even in 1971."

The subsidiary has reduced its operating costs "substantially" McColough said, but has increased its development budget more than 50% from last year.

"We wouldn't want to cut that," McColough said.

McColough laid part of the blame for XDS's poor showing on the declining economy and government cutbacks. The president also noted that small time-sharing companies aren't buying computers right now.

Speaking of the new Sigma 9, McColough said it "looks like a very competitive product but it's too early for it to give a boost to the order situation."

While there have been job reassignments, former XDS head Dan L. McGurk is the only top executive to leave the subsidiary, McColough said.

Overall corporation profits will rise in the fourth quarter, he claimed, but at a slower rate than in previous quarters.

In the third quarter Xerox profits grew 13% from the year earlier period. In all of 1969, profits increased 24%.

The executive said that there had been some softening in the copier market as more companies retrench in the face of the poor economy. Copier business accounts for 86% of Xerox's revenues.

"I don't see any dramatic recovery in the first quarter of 1971," he said, but added "we aren't, in any circumstances, talking about going backward."

The president said that a trial on the patent suit against IBM over IBM's copier is apparently "some time off." He noted, though, that Xerox hasn't felt any competitive impact from the IBM machine.

Econometric Models See'71 Same as '70

As the year turns, the computerized models of the U.S. economy have begun to crank out predictions for 1971. The consensus seems that it will be pretty much the same as the last half of 1970.

Six of the most prestigious econometric models outside the government all agree that 1971 will see the Gross National Product reach $1 trillion, but just barely. Predictions for the year range from $1.043 trillion to $1.059 trillion.

Predictions of the unemployment rate – now estimated at 5.7% to 5.8%, range from 5.2% to 6.1% for 1971.

The models are maintained by two universities, the Wharton School at the University of Pennsylvania and the University of Michigan, and four private firms, IBM, General Electric, Data Resources, Inc., and Townsend-Greenspan & Co.

The models are a series of dependent equations designed to simulate the actions of the economy.

In terms of real growth – as opposed to dollar inflation – the two universities and Data Resources predict a 3.3% growth, and GE and Townsend-Greenspan agree on a smaller 2.5% growth. IBM's model is the most optimistic, forecasting a 4.2% gain.

The most successful of the models in predicting 1970 was the Wharton School's, which foresaw $980 billion GNP, real growth of 0.3%, and a price increase of 4.8%.

The actual 1970 performance turned in a $977 billion GNP, a 0.3% drop in real growth, and 5.2% inflation.

The IBM model predicted a $980 billion GNP.

Memorex Restates 9-Month Earnings From $1.64 per Share to 97 Cents

SANTA CLARA, Calif. – Faced with a barrage of criticism of its accounting methods, Memorex Corp. last week restated its controversial nine-month earnings, lowering them from $1.64 per share to 97 cents.

Revised nine-month net was $3.6 million, compared with the previously reported $6.1 million. In the year earlier period Memorex reported a $4.8 million net, equal to $1.31 a share.

The controversy involved the sale of Memorex peripherals to Independent Leasing Corp., a Memorex subsidiary that is not yet fully capitalized. Accountants and financial analysts criticized Memorex for including the sales to Independent Leasing in its profit statement.

The accounting procedure would be technically correct as long as Independent Leasing is fully capitalized by year end. Memorex maintains that the financing "will be completed and that Memorex will receive payment for all sales to Independent Leasing before the end of 1970."

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TRADE*QUOTES

Computerworld Stock Trading Summary

All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

CLOSING PRICES THURSDAY, DECEMBER 17, 1970

EXCH		1970 RANGE (1)	CLOSE DEC 17 1970	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 6	2	+ 1/4	+14.2
A	APPLIED DATA RES.	4- 24	4 1/4	- 1/2	-10.5
O	APPLIED LOGIC	1- 18	1	0	0.0
O	ARIES	1- 8	1 1/2	- 1/8	-7.6
N	AUTOMATIC DATA PROC	23- 48	46 3/8	- 3/4	-1.5
O	AUTO SCIENCES	3- 14	3 7/8	- 1/4	-6.0
O	BRANDON APPLIED SYS	1- 9	1 1/4	+ 1/4	+25.0
O	COMPUTER AGE INDUS.	1- 3	1 1/2	0	0.0
O	COMPUTER ENVIRON	1- 15	1/2	- 3/4	-60.0
O	COMPUTER INDUS.	2- 24	5	0	0.0
O	COMPUTER NETWORK	2- 14	4 3/4	+2 1/2	+111.1
O	COMPUTER PROPERTY	5- 15	5	0	0.0
N	COMPUTER SCIENCES	6- 34	9 3/4	- 1/2	-4.8
O	COMPUTER TASK GROUP	1- 4	1	0	0.0
O	COMPUTER USAGE	2- 8	5 1/4	+ 3/8	+7.6
A	COMPUTING & SOFTWARE	16- 75	31	0	0.0
O	COMRESS	1- 10	2	- 1/8	-5.8
O	COMSHARE	2- 15	6 1/8	+2	+48.4
O	CONSOL. ANAL. CENT.	1- 4	3/8	- 1/4	-40.0
O	DATA AUTOMATION	1- 24	1 1/4	- 1/8	-9.0
O	DATA PACKAGING	5- 29	5 5/8	- 1/8	-2.1
O	DATAMATION SERVICE	1- 6	7/8	- 3/8	-30.0
O	DATATAB	4- 9	3 1/2	- 3/8	-9.6
O	DIGITEK	1- 5	1 1/8	+ 1/4	+28.5
O	EDP RESOURCES	5- 13	8 1/4	0	0.0
A	ELECT COMP PROG	3- 11	3 1/8	- 3/8	-10.7
O	ELECTRONIC DATA SYS.	31-161	56	-2 1/2	-4.2
O	INFORMATICS	4- 21	6 1/4	+ 1/4	+4.1
A	ITEL	6- 26	15	-1 1/8	-6.9
O	LEVIN-TOWNSEND SERV.	1- 13	2 1/4	0	0.0
A	MANAGEMENT DATA	7- 25	7 1/4	- 1/2	-6.4
O	NAT COMP ANALYSTS	1- 8	2 1/4	- 1/8	-5.2
O	NAT.COMP. SERV.	2- 12	2 3/4	- 7/8	-24.1
N	PLANNING RESEARCH	13- 54	16 5/8	-1 1/8	-6.3
O	PROGRAMMING METHODS	9- 27	15	- 1/2	-3.2
O	PROGRAMMING & SYS	2- 5	2	0	0.0
L	PROGRAMMING SCIENCES	1- 33	3/4	0	0.0
N	SCIENTIFIC RESOURCES	2- 22	3 1/4	- 1/4	-7.1
O	SOFTWARE SYSTEMS	1- 3	1/4	- 1/8	-33.3
O	TBS COMPUTER CENTERS	4- 27	4 1/4	- 1/4	-5.5
O	UNITED DATA CENTER	1- 4	2	0	0.0
N	UNIVERSITY COMPUTING	14- 99	21 1/2	0	0.0
A	URS SYSTEMS	5- 21	6 5/8	- 1/8	-1.8
O	U.S. TIME SHARING	1- 14	2	- 1/8	-5.8
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	20- 52	23 1/4	-1 1/4	-5.1
O	ALPHANUMERIC	2- 15	2 7/8	+ 1/8	+4.5
N	AMPEX CORP	13- 48	16 7/8	- 3/4	-4.2
O	ASTRODATA	1- 34	3/8	0	0.0
O	ATLANTIC TECHNOLOGY	2- 14	3 1/4	- 1/2	-13.3
A	BOLT,BERANEK & NEW	3- 11	5 7/8	- 3/8	-6.0
N	BUNKER-RAMO	6- 14	9 7/8	- 1/4	-2.4
A	CALCOMP	11- 36	26 3/4	-7 1/8	-21.0
O	COGNITRONICS	3- 13	6 1/2	+ 1/2	+8.3
O	COLORADO INSTRUMENTS	5- 12	5 3/8	- 1/8	-2.2
O	COMPUTER COMMUN.	5- 35	7	- 1/2	-6.6
A	COMPUTER EQUIPMENT	4- 12	3 3/4	- 1/8	-3.2
A	COMPUTEST	12- 28	13 3/8	+ 1/8	+0.9
O	CONSOL COMPUTER LTD.	4- 14	6 1/4	- 1/4	-3.8
A	DATA PRODUCTS CORP	5- 28	6	- 1/8	-2.0
O	DATA TECHNOLOGY	2- 23	2 3/4	+ 1/8	+4.7
O	DIGITRONICS	3- 13	3 3/8	- 1/8	-3.5
N	ELECTRONIC M & M	7- 40	7 1/2	-1	-11.7
O	FABRI-TEK	2- 8	2 1/8	- 5/8	-22.7
O	FARRINGTON MFG	2- 17	1 1/2	- 3/8	-20.0
O	INFORMATION DISPLAYS	4- 20	6	- 7/8	-12.7
O	MANAGEMENT ASSIST	1- 4	5/8	- 1/8	-16.6
A	MARSHALL INDUSTRIES	14- 67	20	-3	-13.0
A	MILGO ELECTRONICS	15- 42	24 5/8	-3 1/8	-11.2
N	MOHAWK DATA SCI	19- 87	24 3/8	-1 7/8	-7.1
O	OPTICAL SCANNING	11- 52	13 1/2	- 1/2	-3.5
O	PHOTON	4- 17	7 1/4	- 1/2	-6.4
O	PHOTO-MAGNETIC SYS.	1- 9	1 1/4	- 1/8	-9.0
A	POTTER INSTRUMENT	15- 42	17 1/2	-1 3/8	-7.2
O	PRECISION INST.	6- 25	7 3/4	- 3/4	-8.8
O	RECOGNITION EQUIP	12- 83	15	+1 1/8	+8.1
O	REDCOR CORP.	4- 34	5 1/2	+ 5/8	+12.8
N	SANDERS ASSOCIATES	7- 29	10 3/4	-1 1/4	-10.4
O	SCAN DATA	5- 53	6 3/4	0	0.0
O	TALLY CORP.	10- 23	12	0	0.0
N	TELEX	10- 25	16 1/2	-3 5/8	-18.0
O	VIATRON	2- 51	1 1/2	- 5/8	-29.4
	SUPPLIES & ACCESSORIES				
N	ADAMS-MILLIS CORP	8- 15	12	0	0.0
O	BALTIMORE BUS FORMS	6- 21	7 1/4	+ 1/2	+7.4
A	BARRY WRIGHT	6- 25	8 3/4	- 5/8	-6.6
A	DATA DOCUMENTS	15- 35	16 1/2	-1 7/8	-10.2
N	ENNIS BUS. FORMS	9- 19	10 1/4	- 1/4	-2.3
O	GRAHAM MAGNETICS	4- 11	9 7/8	+ 1/2	+5.3
O	GRAPHIC CONTROLS	6- 17	5 3/4	-1	-14.8
N	MEMOREX	46-166	54	-27 1/2	-33.7
N	3M COMPANY	71-114	96 5/8	+1 1/2	+1.5
O	MOORE BUS. FORMS	25- 39	36 1/4	+1 1/4	+3.5
N	NASHUA CORP	21- 43	26 1/4	+1 7/8	+7.6
O	REYNOLDS & REYNOLD	25- 48	37 1/2	0	0.0
O	STANDARD REGISTER	17- 30	16 1/2	-1 1/2	-8.3
N	UARCO	22- 39	24 3/4	-1 3/8	-5.2
A	WABASH MAGNETICS	7- 30	6 3/4	- 3/8	-5.2
O	WALLACE BUS FORMS	17- 41	17 1/2	- 5/8	-3.4
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	78-173	106 1/2	-6 1/4	-5.5
N	COLLINS RADIO	9- 37	13	-1 5/8	-11.1
N	CONTROL DATA CORP	30-122	52 1/2	+1 5/8	+3.1
O	DATA GENERAL CORP	16- 59	22 3/4	-5 1/4	-18.7
N	DIGITAL EQUIPMENT	50-124	54 5/8	-9 3/8	-14.6
N	ELECTRONIC ASSOC.	3- 11	4 1/4	+ 1/4	+6.2
A	ELECTRONIC ENGINEER.	3- 14	4 1/2	+ 1/4	+5.8
N	FOXBORO	18- 39	23 5/8	+ 7/8	+3.8
O	GENERAL AUTOMATION	9- 42	11 1/2	-2 3/4	-19.2
N	GENERAL ELECTRIC	60- 91	91 1/4	+1 3/8	+1.5
N	HEWLETT-PACKARD CO	19- 45	30 3/4	+1	+3.3
N	HONEYWELL INC	65-152	82 5/8	-2 5/8	-3.0
N	IBM	223-387	313	-4 1/2	-1.4
N	NCR	30- 86	35 1/2	-1 5/8	-4.3
N	RCA	18- 34	26 1/2	- 1/8	-0.4
N	RAYTHEON CO	16- 33	25 3/4	+1 1/4	+5.1
O	SCI. CONTROL CORP.	1- 8	1 1/2	- 1/4	-14.2
N	SPERRY RAND	19- 40	23 3/8	-1	-4.1
A	SYSTEMS ENG. LABS	10- 49	15 1/8	- 7/8	-5.4
N	VARIAN ASSOCIATES	9- 29	13 1/8	0	0.0
A	WANG LABS.	18- 51	30	-2 7/8	-8.7
N	XEROX CORP	66-115	84 5/8	-1 3/8	-1.5
	LEASING COMPANIES				
O	BOOTHE COMPUTER	8- 25	13	+ 3/8	+2.9
O	BRESNAHAN COMP.	2- 9	2 3/8	+ 1/8	+5.5
O	COMPUTER EXCHANGE	2- 8	4	0	0.0
A	COMPUTER INVSTRS GRP	4- 12	6 3/4	- 5/8	-8.4
N	DATA PROC. F & G	6- 32	10 1/4	-1	-8.8
O	DATRONIC RENTAL	2- 8	2 1/4	- 1/4	-10.0
A	DEARBORN COMPUTER	10- 24	20 5/8	+2	+10.7
O	DIEBOLD COMP. LEAS.	2- 8	4 1/8	0	0.0
A	DPA, INC.	3- 10	3 3/4	- 1/8	-3.2
A	GRANITE MGT	7- 22	7 3/4	- 3/4	-8.8
A	GREYHOUND COMPUTER	5- 44	6 1/4	- 1/8	-1.9
N	LEASCO DATA PROC.	7- 30	13 1/4	- 3/8	-2.7
O	LECTRO MGT INC	2- 9	1 3/4	- 3/8	-17.6
A	LEVIN-TOWNSEND CMP	3- 19	4 3/4	- 1/8	-2.5
O	LMC DATA, INC.	1- 3	5/8	0	0.0
O	NCC INDUSTRIES	3- 8	3 1/4	- 1/8	-3.7
O	SYSTEMS CAPITAL	1- 8	2 3/4	+ 5/8	+29.4
N	U.S. LEASING	3- 19	13 1/4	-1 1/4	-8.6

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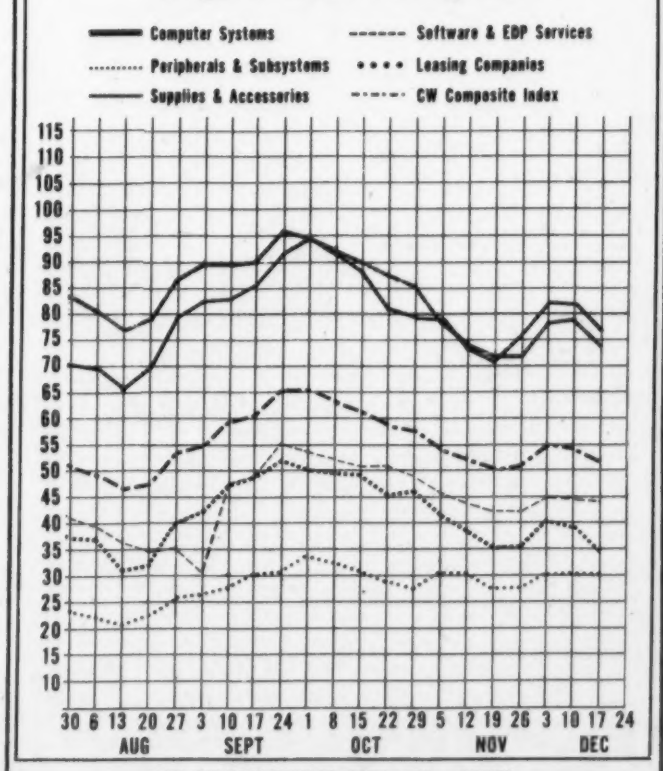
Computer Stocks Trading Index



BASE FOR EACH TRADING INDEX: 100 as of 3/1/68

Burroughs Shows Profit Rise, But Cuts Workforce

DETROIT – While many segments of the computer industry have been smarting from the recession and inflation, Burroughs Corp. has managed to keep profits rising. The latest figures – for the nine months – show the company's earnings up 17% from 1969.

In an effort to keep profits growing, Burroughs last week revealed that by the end of December it will have decreased its number of employees 9% worldwide.

Total employment will be about 48,000, down from 52,627 a year ago.

The company also said it was laying off 500 at its Plymouth, Mich., plant, nearly all production workers.

The official explanation of the layoffs is a change of product lines "from mechanical and electromechanical to fully electronic equipment and systems."

"Current levels of economic activity" also took part of the blame.

A spokesman for the manufacturer said that a large part of this year's layoffs was in the defense, space, and special systems group.

Government orders for the first nine months were off 31%.

The computer segment of Burroughs is still doing well, though. Over 50% of the company's business will come from EDP, up from 25% in 1964.

Earnings Reports

PROGRAMMING & SYSTEMS INC.
Six Months Ended Aug. 31

	1970	1969
Shr Ernd	$.07	$.06
Revenue	2,391,815	2,593,629
Earnings	219,944	203,728

AUTOMATION SCIENCES INC.
Three Months Ended Oct. 31

	1970	a1969
Shr Ernd	b$.04	.....
Revenue	476,466	.....
Spec Cred	35,455	.....
Earnings	c81,188	.....

Year Ended July 31

	1970	1969
Shr Ernd	.....	.29
eRevenue	2,703,544	2,195,615
Spec Chg	f127,990	.....
Earnings (Loss)	(205,112)	298,401

a-Comparable figures not available as the company previously reported on a six months and annual basis. b-Based on income before special credit. c-Equal to 8 cents a share. e-From continuing operations. f-Consists of $71,473 from investments and marketable securities and an estimated loss of $[illegible],517 from the discontinuance of businesses.

MOHAWK DATA SCIENCES
Three Months Ended Oct. 31

	1970	1969
Shr Ernd	$.23	a$.32
Revenue	21,780,000	24,955,000
Spec Cred	.....	b275,000
Earnings	1,265,000	c2,025,000

a-Based on income before special credit. b-Gain on revaluation of foreign currencies. c-Equal to 37 cents a share.

TECHNICAL OPERATIONS INC.
Year Ended Sept. 30

	1970	a1969
Revenue	$11,728,000	$12,105,000
Spec Cred	.....	b287,000
Earnings (Loss)	(1,449,000)	c131,000

a-Includes operations of Joyce, Leobel & Co. and subsidiaries from April 1, 1969, date of purchase. b-Gain from sales of real estate. c-Equal to 17 cents a share.

WALLACE BUSINESS FORMS
Three Months Ended Oct. 31

	1970	1969
aShr Ernd	$.26	$.25
Revenue	8,011,000	7,432,000
Earnings	467,000	440,000

a-Adjusted to reflect two-for-one stock split in November 1970.

DATA DOCUMENTS INC.
Year Ended Sept. 30

	1970	1969
Shr Ernd	$1.68	a$1.77
Revenue	24,301,995	20,930,342
Tax Cred	.....	77,317
Earnings	790,192	b902,966

a-Based on income before tax credits. b-Equal to $1.94 a share.

Buying computer tape is a lot like getting married.

No matter what brand of tape you buy, you're gonna have to live with it for a long time. For better or worse. Through read and write.

So it pays to look under the make-up and fancy promises—to find out what you're really getting before you say, "I do."

For instance, one leading tape manufacturer talks about a one year, 200-pass warranty. But the warranty for defective tapes terminates on completion of the first write pass . . . or the first read pass . . . or 90 days from delivery.

EPOCH 4

permanent magnetic tape

And another real sweetheart requires initial use within 90 days. And excludes tape testers.

Then there's Epoch 4—the one with the twenty-year warranty. No gimmicks, no tricky clauses. Epoch 4 will meet the original specs for twenty years. Or we'll replace it.

Sure, it pays to look over the field before you make a commitment—in marriage, or in computer tape. Just be sure you meet the beautiful performer with the twenty-year dowry—Epoch 4 from Graham Magnetics. You'll fall in love with it.

GRAHAM MAGNETICS INCORPORATED

Graham, Texas 76046 WATS Phone 800-433-2701 Texas Phone 817-549-3211